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DESTRUCTION OF DERELICTS.

The committee on commerce of the senate has recommended that the bill to appropriate $175,000 for the construction of a vessel to destroy derelicts be passed. The committee suggests, however, that the field to be covered is so vast that the building of a single vessel especially equipped for the destruction of derelicts, while a very valuable agent, would not seem to be an adequate provision. Whoever is to take charge of the work should be able to draw from time to time on the government's extended fleets under different departments—vessels of the navy, revenue cutter service, lighthouse establishment, coast and geodetic survey, fish commission and quartermaster-general's office. The bill, therefore, contains the further provision that as soon as the whereabouts of a derelict is reported the secretary of commerce will ascertain what vessels of the government are in port nearest to the derelict, can ask the president to detail it, and the secretary can then put dynamite on board and send the vessel on the search. Wireless telegraphy is now available to aid in a search which has heretofore been like looking for a needle in a haystack. It is estimated that about $15,000 a year will be sufficient for dynamite and incidental expenses. The removal of derelicts is of as much benefit to foreign vessels as to American vessels, and there seems to be a propriety in using a part of the tonnage tax fund in the direction proposed. On the subject of derelicts Com'dr W. H. H. Southerland, hydrographer of the navy, says:

"A floating derelict, particularly when bottom up, constitutes a menace to life and property, the gravity of which cannot be overestimated. I inclose herewith a memorandum giving the instances of collisions with derelicts, under different headings, for the last ten years—that is, such instances as have been reported to the hydrographic office, and these only in the north Atlantic ocean. An examination of this memorandum will show many instances where much damage has been done. It must also be taken into consideration that it is possible that some of the large number of vessels which have gone to sea and never been heard of afterwards during the past ten years may have been lost through collisions with these floating dangers. This cannot be asserted positively, as in many of the cases none of those concerned lived to tell the tale. From reports received in the hydrographic office during many years past it is estimated that not less than nineteen of these floating dangers are adrift in the north Atlantic all the time, and that the average period adrift for each one is approximately thirty days. This is only an average. In some cases they remain adrift for many months at a time, and in one case—that of the three-masted schooner Fannie E. Wolston—the period adrift was three years and six days."

The memorandum submitted by the hydrographer showed that all of the vessels which struck these floating obstructions were badly damaged.

THAT DOMINION CRUISER.

Given a theme it does not take a newspaper very long to make a romance. It is wonderful what webs they can weave with very slender threads. The little steamer for fisheries protection on Lake Erie which the Dominion government is building at Toronto has been transformed into a formidable armed warship whose construction is directly in violation of the treaty of 1817. It isn't likely that Canada would deliberately violate that treaty, knowing well enough that if it did it would be playing a losing game. Everyone knows that these fishing raids into Canadian waters are nothing less than piracy. Every fisherman knows where the line is, for a straight course from the southeast shoal to Buffalo would be entirely in Canadian waters; and yet repeatedly this line is crossed. The Petrel which has been looking after Canada's interests in the fisheries of Lake Erie, is not a fast vessel, and when she starts from Point au Pelee on a straight course down the lakes she can be seen for half an hour, ample time for the fish tugs to get out of the way. Some of the faster tugs, like the Silver Spray, holding the Petrel's cruising powers in contempt, have waited to come into gun range, well knowing that the Petrel carried no guns capable of doing great injury. It is to the interests of both Americans and Canadians that the fishing industry of the great lakes should be protected, and it probably will effectually be when the Dominion government places on the lakes a cruiser swift enough to overtake the fastest of the fishing tugs.

Meanwhile if anything comes of this agitation to the end that the treaty of 1817 may be abrogated to the extent of permitting the lighter class of warships to be built on the great lakes it will not have been threshed in vain.

Ship owners and captains of coastwise vessels have formed the American Seamen's Federation to combat the methods employed by the Atlantic Coast Seamen's union. Offices have been rented at No. 3 State street, Boston.

COMPULSORY PILOTAGE FEES.

From an impartial view of the situation it would appear as though congress should put a stop to the compulsory pilotage charges upon coastwise sailing vessels which are kept up by some of the southern states. Coastwise commerce certainly should be subject only to national regulation. The discrimination between sail and steam vessels is without justification, for where the former have not plenty of room to navigate the entrance to ports they employ tugs, and besides paying for these they have to pay the local pilot fees for which they get no service whatever. Where the vessels can be taken into harbors without tugs their own sailing masters are as capable of doing it in most cases as the local pilots. Where they are unfamiliar with the ports they would voluntarily employ these undoubtedly, but now they are compelled to take them whether they need them or not. This is not so north of Virginia, and there is discrimination between coast ports which is unjust to the vessel owners and unwise on the part of the states that heap up the extortion for the sake of small bodies of men who profit by it. The pilots are the only persons who gain anything except that coastwise steamers may derive some small gain at the expense of sailing vessels whose voyages are oftentimes made wholly unprofitable by these exactions.

American legislation is supposed to favor the coastwise trade so long as it is carried in American vessels. But here is a class of American vessels which maintain a wholesale competition in the coastwise trade, and keep a check upon the cost of transportation, not only by steam vessels but by railroads between the same points on shore, and a few states are permitted to put an unjust burden upon them by these compulsory pilot charges. The full text of the bill which seeks to remedy this matter is as follows:

"Whenever the master or mate of a sailing vessel of the United States employed in the coastwise trade claiming to be a skillful pilot offers himself for a license, the inspectors shall make diligent inquiry as to his character and merits, and if satisfied from personal examination of the applicant, with the proof that he offers, that he possesses the requisite knowledge and skill and is trustworthy and faithful they shall grant him a license for the term of five years to pilot any such vessel within the limits prescribed in the license; but such license shall be suspended or revoked upon satisfactory evidence of negligence, unskillfulness, inattention to the duties of his station, intemperance, or the willful violation of any of the provisions of this title.

"Sec. 2. That section 4,444 of the revised statutes be and is hereby amended to read as follows: No state or municipal government shall impose upon pilots of vessels any obligation to procure a state or other license in addition to that issued by the United States, or any other regulation which will impede such pilots in the performance of the duties required by this title; nor shall any pilot charges be levied by any such authority upon any vessel piloted as provided by this title, nor upon any vessel of the United States employed in the coastwise trade being towed into or out of any port of the United States by a vessel under the command of a pilot licensed for such port under the laws of the United States, and in no case shall the fees charged for the pilotage of any vessel exceed the customary or legally established rates in the state where the same is performed. Nothing in this title shall be construed to annul or affect any regulation established by the laws of any state requiring vessels entering or leaving a port in any such state other than coastwise vessels to take a pilot duly licensed or authorized by the laws of such state or of a state situate upon the waters of such state.

"Sec. 3. That section 4,237 be, and is hereby, amended to read as follows: No regulations or provisions shall be adopted by any state which shall make any discrimination in the rate of pilotage or half pilotage between vessels sailing between the ports of one state and vessels sailing between the ports of different states, or any discrimination against vessels propelled in whole or in part by machinery or sail, or against national vessels of the United States; and all existing regulations or provisions making any such discrimination are annulled and abrogated.

"Sec. 4. That this act shall take effect six months after its passage."

Secretary Moody has asked congress for an immediate appropriation of $200,000 to enable payment to be made to Cuba for the land acquired by the United States for the Guantanamo naval station and to enclose the same within a wall or fence according to the terms of the treaty.

A San Francisco correspondent reports that the Dollar Steamship Co. has contracted for an open-deck wooden-hull, steam schooner of 900,000 ft. lumber capacity for a special trade and that several contracts for similar vessels will be closed shortly after the first of the year.

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HARBOR IMPROVEMENTS AT LIVERPOOL.

Enterprise of the Mersey Docks and Harbor Board—British Efforts at Growing Cotton—Depression in Iron and Steel Trades.

Liverpool, Dec. 21.—The Mersey Docks and Harbor Board has carried an enviable reputation among British port authorities for its policy of anticipating the trade of the future, and for the quick despatch and accommodation its docks afford for the largest type of vessels yet built or even projected. The many Atlantic leviathan vessels with their deep draught and immense beam and length have been provided for, thanks to the foresight of this dock board, and even now they are not disposed to halt in view of the building of larger vessels of 800 ft. length foreshadowed from the American side of the Atlantic. Details of the new docks and dock extensions provided during the year have this week been made public by the dock board, and the magnitude of the work can be gathered from the fact that considerably over £1,000,000 has been expended during the financial year in their construction. In reviewing the progress of the year's improvements, Mr. Robert Gladstone, the chairman, at this week's meeting made some observations which foretold further important developments on the dock board's estate. The milling industry is to be encouraged, and negotiations are at present proceeding between the board and several firms of millers with a view to having more flour mills erected on the quay sides of various docks. A large granary is already being erected at the Coburg dock. The new entrances to the Brunswick dock system, Mr. Gladstone described as a most magnificent piece of work. They were almost a duplication of the London dock entrances, but he had been told by experts that those at Brunswick dock presented greater facilities for docking ships than any entrances into any docks elsewhere, and what was also very interesting was the fact that these two entrances would provide for the entrance with the greatest ease of the largest steamers at present contemplated. They had heard quite lately—it might not be true, but he had seen it in print—that it was contemplated to build new steamers in America of 800 ft. length and of proportionate depth and breadth, and these entrances would allow such steamers to enter with the greatest facility, and there would be ample room for them after they got in. Another great scheme of the dock board which aims at reviving the ship building industry on the Mersey is the walling in of Tranmere bay, and according to Mr. Gladstone the construction of this river wall is well in hand, as well as the proposed graving docks for ship building and repairing purposes behind it. These works when completed will contain an area of about 62 acres, and will be used for ship building purposes by the Tranmere Bay Development Co., in which the well-known firm of Messrs. Laird Bros. is largely interested. In days gone by Liverpool used to have a great name for ship building—in the days of wooden ships—and with coal, iron and labor being so readily available, there seems to be no reason why Liverpool should not regain her position as a great ship building center.

In view of the increasing size of ships and the great loss that would attend any delay in shipping owing to insufficient depth of water, I may here note what Liverpool is doing in regard to dredging operations. Since 1890, 75,000,000 tons of sand has been removed from the bar and the several channels in Liverpool bay. With the huge dredgers at work throughout the year there has been a uniform depth of 27 ft. at low water maintained at the bar and in the main channel, and in the near future this depth will it is expected be increased to a uniform depth of 30 ft. at low water. That the trade of the port is developing is best shown by the fact that for the six months since July 1 last, there has been an increase of 673,000 tons in the tonnage of ships using the port as compared with the corresponding six months of last year. The increase of the revenue derived from the cargoes carried has not, however, been in proportion to the increased tonnage, from which it must be gathered that vessels have not been bringing full cargoes. There is, however, some consolation in the fact that the increase in the dues for the period named has amounted in round figures to £50,000, whereas the increase for the same period last year was only £25,000. In this connection Liverpool shipping men have been startled by Mr. Gladstone's announcement that it is the intention of the dock board to again apply to parliament for powers to alter their basis of charging dues from net registered tonnage to 50 per cent. of the gross register of ships. A similiar application was made in the last session of parliament, which was granted by the house of lords, but was subsequently reduced by the house of commons to 40 per cent. This the dock board has refused to accept, much to the disappointment of ship owners, who thought until now that they had heard the last of the matter. The dock board's contention is that the net register does not apply to present conditions at all. A vessel, whether it is full of engines or cargo, required the same depth of water, the same breadth of gates and the same facilities at the quay. If they could get authority to charge on 50 per cent. gross tonnage instead, the board say they will get over a difficulty which they at present have with foreign ships, notably French, German, Spanish and Italian, which trade here with registers calculated upon a different basis than those which exist in Liverpool. There will doubtless be further organized opposition by the large steamship owners, especially the Cunard Line, who did so much to defeat the previous effort, and in this connection I have heard a proposal made from a high authority who foresees that some change must in the near future be made, that dues should be charged on gross measurement of all ships, with a corresponding reduction in the fixed rate of dues. What action the Liverpool Steamship Owners' association will take is awaited with no little interest.

There is one more item in connection with the administration of the Mersey docks' estate which I think will interest your readers. For some time past negotiations have been in progress between the dock board and the leading British railway companies regarding the through transit trade, and these have been carried through successfully to a certain point. Certain details remain, however, yet to be arranged, but the fact gives wide satisfaction that cheaper transit facilities will soon be provided, as well as some welcome departures in the handling of cargo. In this connection the past year has witnessed some advance by the introduction of motor wagons in the removal of goods from the quays, and their success has been such that Mr. Gladstone looks with confidence to the ultimate disappearance of horses from the dock sheds where they take up so much room as compared with the motor wagons, not to mention the quicker despatch resulting from the working of the latter.

The British Cotton Growing association, which has been brought into existence by the recent crisis in the cotton industry of Lancashire, and which seeks to encourage the growth of cotton in British colonies, and so make up for the shortage in the American supply, is just now directing some important operations on the west coast of Africa and elsewhere. There has this week sailed from Liverpool for the west coast of Africa Mr. Echols, a cotton expert from South America, who is going out under the auspices of the before-mentioned association and the British colonial office to superintend the cultivation of cotton in the Gambia district. There are now five cotton experts in West Africa, namely at Sierra Leone, Lagos, Southern Nigeria, the Gold Coast and the Gambia district. Further there are great preparations being made in Liverpool just now, where there is now stored some 3,000 bags of West African cotton awaiting the ginning process, the machinery for which is in course of erection. Whatever the results of the operations may be, the importers of this particular cotton seem to be sanguine of success, while the British Cotton Growing association is none the less optimistic as regards its efforts to in due time make up the deficiency on American account and avoid such another calamity as that which recently visited the cotton industry of Lancashire. The cause is being strongly backed by many Lancashire men of influence and money.

From reports to hand at the time of writing the outlook in the iron and steel trades in both North Lancashire and South Wales is described as exceedingly black. In consequence of the importation of German and American steel bars for the manufacture of tin plates in South Wales 300 workmen employed at the Swansea Hematite Works belonging to Messrs. Balwin have received notice of termination of contracts, and a similiar notice has been posted at the Duffeyn Steel & Tinplate Works at Morriston, where 100 steel workers are employed. In the Welsh steel trade generally the masters are demanding a reduction of 15 per cent. in wages, but this is being resisted and at the time of writing they are still in disagreement. In the Barrow-in-Furness district there is a like depression which is causing some anxiety. Messrs. Kennedy Bros. have discharged a considerable number of men employed at their mines near Barrow and others are likely to follow their example. The Lindal Moor Mining Co., the oldest mining firm in Furness, whose extensive mines are situate between Dalton and Ulverston, have given nearly 200 men a fortnight's notice, while at the annual meeting of the North Lousdale Iron & Steel Co. at Ulverston, this week, the chairman said that owing to the distressed condition of trade the directors were considering the advisability of putting another furnace out, leaving only one in blast, as there seems to be no immediate prospect of an improvement. All the furnaces in Barrow except one are to be blown out and the steel works are to be closed for a fortnight over the holidays. This slackness, particularly in the latter district, has already brought about some distress, which it is feared from present indications will be greatly increased.

LEBANON CHAIN WORKS IN OLD HANDS.

On Tuesday of last week Mr. Eli Attwood, formerly president and general manager of the Lebanon Chain Works of Lebanon, Pa., purchased the Lebanon plant from the Standard Chain Co. The business of this well-known concern—well known especially in shipping and ship building circles—will temporarily be conducted under the name Attwood Chain Works, but it is expected that within a few weeks the necessary legal proceedings to restore the old name to the works as an independent plant will be over with. All rights pertaining to the new link-bending machine, of which Mr. Attwood is the patentee, were included in the sale, thus enabling the Lebanon Chain Works to cater to the trade for side-welded chain up to and including iron of 3½ in. diameter, the manufacture including all sizes from ¼ in. to 3½ in. thickness. The output of this works from its own iron includes high-class ship's cables, steel and iron dredging chains, crane, mining and rigging chains, chains for differential pulley blocks, all sizes of machine chains, etc. A specialty is made of high-grade tested chains.

The Clyde Line steamer Kiowa, engaged in freight business, was run into and sunk by the Admiral Dewey of the United Fruit Co.'s fleet about a mile off Boston light a few days ago. The collision occurred in a thick snowstorm.

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A PERIOD OF DEPRESSION FEARED

In British Ship Building—Submarines and Submersible Boats—Glasgow Shipping Letter.

Glasgow, Dec. 21.—The ship building trade is getting more depressed, and there is fear that the distress will become more marked at the turn of the year, as the immediate prospect is distinctly gloomy. During the past few months production has been active, and the result is that there are now many gaps on the stocks. While the output has been well up to previous averages, there was no corresponding activity in booking fresh work, although a few noteworthy contracts have been placed. A leading ship builder thus puts the position: "We are on the fringe of a cycle of lean months. At present there is no inducement to ship owners to build. No doubt some anticipate a return of prosperity in shipping and ship building, but their reasons, not to put too fine a point upon it, are very flimsy indeed. For some time cargoes have been diminishing, and freights have been shrinking, while, on the other hand, there have been no corresponding decreases either in the prices of ship building material or in labor." And he added: "I cannot account for such optimism. The fact is that unless there is an immediate and unprecedented expansion in the world's trade we may prepare for the worst. Of course, I admit that the settlement of the Eastern question and the solving of the labor problem in South Africa would materially alter the situation, but the probability of either of these difficulties being settled in time to save the position seems exceedingly remote. No doubt the life of a vessel is much shorter in these days of hurry, and it is equally true that competition compels owners to follow each other's lead in building, but I am afraid they will be slow to order new tonnage while things remain as they are at present."

As regards Glasgow itself, the idle books of the various trade societies are not excessively crowded for the time of year, but it is impossible to obtain an accurate estimate of the number of unemployed in the organized trades. Trade union officials are not willing to gratify curiosity on that point. They argue that if it became known there was an exceptional number of idle men in a certain branch of industry it might lead to the reducing of wages. But the present condition of the trade in this city indicates the approach of a period of depression. When the ship yards are dull a whole host of industries are crippled.

TRIALS OF A BABCOCK & WILCOX BOILER SHIP.

The battleship Queen is specially interesting as the first of the class to complete trials with Babcock & Wilcox water-tube boilers with satisfactory results. On the full-power trial there was consumed 23¾ lbs. of coal per square foot of grate per hour, and rate of consumption per unit of power developed was 1.75 lbs. On the thirty hours' trial at three-fourths power, the boilers consumed 16½ lbs. per square foot of grate per hour, and the economy was greater, the consumption per unit of power being 1.61 lbs. On the low-power trial the consumption was 1.84 lbs., but the ratio of the power of the main engines to the power of the auxiliary machinery is much higher than at other trials, and the latter power is never included in the calculations. The draft pressure in the stokehold at the full-power trial was ½ in., and with a steam pressure of 243 lbs., the engines, making 116.15 revolutions, developed 15,556 H. P. On the trial at three-fourths power the pressure was 232 lbs., the revolutions 106, and the power 11,670 I. H. P.; while on the low-power trial, when only six of the fifteen boilers were working, the power for sixty-nine revolutions was 3,058 I. H. P. The Queen was built at Devonport dock yard, her engines were supplied by Harland & Wolff, Belfast, and her boilers by Babcock & Wilcox, Glasgow. She is a ship of 15,000 tons displacement with four 12-in., twelve 6-in. and twenty-eight smaller guns.

SUBMARINES AND SUBMERSIBLE BOATS.

The French minister of marine has made an interesting statement on the relative advantages of the submarine and the submersible boats. The former is a type of vessel which never runs on the surface of the water; the latter steams on the surface until it is time to dive, and resembles in general principle the British Vickers' boats. But neither the motive power nor the method of diving is the same, and this constitutes the difference between British success and French failure. As no satisfactory gasoline motor has been secured in France, steam is used there, and the stopping of the fires causes delay at the time of sinking, with even more serious delay when the vessel rises to the surface. A submarine of equal weight, 400 tons, gives 3,000 cu. ft. more space than the submersible; but the latter by being able to come to the surface, can regenerate the air, take a wider view of surroundings, and be more effectively navigated, although the submarine, being always submerged, is not subjected to surface wave motion. Great size is more possible with the submersible boat, and while ordering two submarines of an improved type, the French minister of marine is ordering a new submersible of 400 tons, which will be the largest of the French boats, and intended primarily for offensive rather than defensive tactics.

The activity of foreign governments in experiments with submarine boats is remarkable, and seems due to the belief that Britain, having solved the problems of under water navigation, is certain to make effective use of the type when occasion arises. Russia has made great progress, and trials just completed with a boat built to the design of Engineer Rubnoff have resulted in orders being placed at the Baltic works for six similar vessels. The Rubnoff boat went out to sea from Cronstadt for thirty-six hours, and for twenty-six consecutive hours was submerged. The best speed attained was between 8 and 9 knots, which is short of that of the British new craft. Chemical reaction is the means adopted for regenerating the air when submerged. Germany has not succeeded with an adaptation of the Holland boat, but another type is in course of construction. Experiments in Italy are promising. The general situation indicates universal agreement as to the desirability of possessing such craft, and the idea is suggested that should there be war between Russia and Japan, the latter power should be put into possession of a submarine, or rather submersible, boat on the British, or Vickers', principle, so that data might be got as to behavior in actual warfare.

NICKEL STEEL FOR BOILER TUBES.

The use of nickel steel is very considerably extending although not so much, perhaps, as in America where you have the material. We note the considerable development in the use with you for boiler tubes, in connection with new tubulous generators, where sound material is of the utmost importance. Nickel steel gives a much higher tensile strength, and the percentage of nickel in American practice seems to be 5 per cent. greater than in this country, the nickel constituting 30 per cent. of the total weight. The tubes made in the states range, I understand, in sizes from ⅝ in. to 4 in. in external diameter, the latter for large tube boilers. The higher tensile strength will be accompanied by a greater elastic limit, minimizing leakage at the junction of the tube with the tube plate. There is an absence of brittleness, and we have proved in this country that nickel steel does not corrode. For torpedo craft the saving in weight is very considerable. The advantage in a 500 H. P. boiler for stationary purposes is 2 tons; in a 2,000 H. P. installation, 8½ tons; while in torpedo destroyers of 2,000 to 3,000 H. P. the economy in weight ranges up to 11 tons, and in the United States battleships, I believe, to 38 tons. The drawback is the greater cost, steel with 30 per cent. of nickel costing three times the price of mild steel. The difference in first cost is qualified by the fact that less of it is required and the scrap fetches more money.

SHIPPING LAWS SHOULD BE RECONSIDERED.

Lord Inverclyde, chairman of the Cunard company, at a recent shipping dinner stated that our shipping laws were out of date. The time had come when the question of the navigation and shipping laws of this country must be faced and reconsidered. Foreign ships that came to our ports ought to be put in exactly the same position as British vessels. British ship owners did not ask for any position of advantage over their foreign rivals, but they desired to be able to compete with them on equal terms in the home ports. Another matter which required to be dealt with was the question of moderate speed at sea, which at present was in a very unsatisfactory position, and without proper definition. He had seen it stated that the formation of the American shipping combine was the death-blow of British shipping on the north Atlantic. He was not prepared to admit that statement. He believed there was room for them all, and, speaking for the Cunard company, they had not the slightest intention of allowing any such death-blow to be inflicted upon them. Possibly the Cunard company had been put in an exceptional position by their agreement with the government, but he took that opportunity of stating that the policy of the company was not to depend upon that agreement, but rather to rely for success upon carrying on the trade by their own efforts upon the soundest commercial basis. Whatever British ship owners had to meet in the future, either in connection with legislation, or with combinations, or with the efforts of other countries to improve their maritime position, he felt satisfied they would all endeavor to do their best to maintain the supremacy of the British mercantile marine.

PROPOSAL TO LAY UP SAILING SHIPS.

In shipping circles generally the recommendations of International Conference of Sailing Ship Owners, held recently in Paris, is looked upon with great interest, but there does not appear to be great hope that united action will actually result. The proposal to lay up a certain proportion of the sailing ships of the world might meet the crisis if it could be acted upon, but the French ship owners are not likely to comply with it. They must keep their ships at sea or they will lose their bounty, and to make anything out of the subsidy, they must take long voyages, which are just those that are at present most unprofitable to other ship owners. It is stated that, even with the bounty, many French sailing vessels are not paying. Sailing ship owners here think the resolution of the Paris conference to be worth trial. Further conferences will be necessary, if effect is to be given to the resolution, and a scheme of minimum freights prepared for submission to the general body of members, but whatever the respective associations may do they cannot bind their members.

MISCELLANEOUS MATTERS.

In the mail-run competition on the Atlantic the Cunard is still holding first place. The Cunard liner Etruria arrived at Liverpool at 2 o'clock on Saturday afternoon, Dec. 12, from New York, after an unusually quick voyage. The American liner Philadelphia was not due at Southampton till 4:30 on the Saturday afternoon, with the bulk of the American mails for London and the north. Letters by the Etruria for London were delivered on Saturday night, those by the Philadelphia could not be delivered in London till the Monday morning. The same applies to the letters by the American liner for Scotland, while

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letters for Scotland via the Etruria were ready on Sunday morning.

The arrival of the Donaldson Line steamer Concordia at Glasgow from St. John, N. B., and Halifax, N. S., marks the completion of the first round trip of the winter season between the Clyde and the Canadian winter ports. The Concordia brought 244 head of cattle and a large general cargo. She reports trade as being very good on the other side. Weekly sailings to and from these ports are being maintained by the Donaldson fleet, and the Lakonia sails for New Brunswick and Nova Scotia with a cargo of general goods and coal. The trade, however, is not anything like as brisk as last winter.

The Allan Line has had a satisfactory year in the passenger business, increases being shown in both the Liverpool and Glasgow services. This year the line carried in their Canadian boats a total of 38,914 passengers of all classes, as compared with 29,010 carried last year—an increase of 9,904.

The tonnage entered at ports in the United Kingdom from foreign countries and British possessions, with cargoes, during the eleven months ended Nov. 30 amounted to 36,468,819 tons, and the tonnage cleared to 43,559,485 tons, as against 34,714,989 tons entered, and 41,178,184 tons cleared in the similar period of the year 1902.

REVIVAL OF OUR MERCHANT MARINE.

Spirited indeed was the last meeting of the New York Board of Trade and Transportation. The special committee on the merchant marine made a report which was signed by Aaron Vanderbilt, Darwin R. James, Henry A. Rogers, Patrick Farrelly and Oscar S. Straus. They outlined in the report the form of canvass made throughout the country and the results of it. The report was in part as follows:

"Copies of the board's statement of facts, of the board's resolutions and of an interview in which the chairman of the committee set forth the broad scope and non-partisan purpose of our inquiry, were forwarded to all the newspapers and commercial associations of the United States, and later to the senators and representatives in congress. We may well say that we have been gratified by the volume and character of the responses. The result has been a vivid demonstration that popular interest in the cause of American shipping is deep and earnest, not only in our seaboard communities but in the Mississippi valley and the farther west. We have received replies from nearly every state and territory in the union, hundreds in aggregate number, all manifesting a desire for the upbuilding of a new American merchant marine and an eagerness for further information on the subject. Many commercial associations, in answer to the board's request, have adopted resolutions urging the question of the American ship upon the attention of the country's business interests and of congress. Some of these resolutions have indicated a preference for this or that particular policy of relief, but in the majority of cases there has been merely an emphatic declaration that something should be done, leaving the precise method to further investigation or to the wisdom of the government.

"All of the expedients for the restoration of our shipping that have been discussed in recent years are mentioned in the letters and resolutions that have come to us. The subsidy policy is naturally conspicuous. It has a great many earnest and informed supporters, especially among practical shipping men of the two seaboards. It also has its opponents, whose objections are such as have from time to time been strenuously urged against a shipping subsidy policy for the United States. Discriminating duties and tonnage dues have their earnest adherents among the individuals and associations that have responded to our circular. They are often urged as an alternative to subsidies, and their success in the early development of the merchant marine from 1789 to 1830 is cited as a strong point in their favor. Of the policy of free ships, or free registry for foreign-built vessels, relatively little is now heard. This is due, perhaps, to the evolution of a group of large and well-equipped steel ship yards in America, which are suffering from a lack of sufficient employment. There is no lack of mechanical facilities in this country to construct any kind of ship demanded for the purposes of modern commerce. Another method for creating a large American merchant fleet has been suggested under a serious misapprehension. That is, the recommendation that the materials for constructing American ships be admitted free of duty. It does not seem to be generally known that such materials for vessels for the foreign trade and also for the long-voyage trade between our Atlantic and Pacific coasts are already and have long been on the free list."

Mr. Herman Sielcken, a member of the committee, submitted a minority report. He differed with the majority report as to some of the matters stated therein. He thought especially that the expression "alarming depleted state of American shipping in the foreign trade" was likely to be erroneously construed. Continuing he said:

"It is necessary to state that there is no decline or decrease in American steam tonnage, as it is about the same today as it has been in the past. The decrease in American tonnage is simultaneous with the decrease of sailing vessels all over the world. In former years the United States could advantageously construct wooden sailing vessels and sail them in competition with the world, as the vessels could be constructed fully as low as in Europe, and the manning of sailing vessels is as important a factor as the expense of the crew in manning a steamer. It is true that the American tonnage has decreased, but not the American shipping to foreign ports, and the reasons for the decrease, while deplorable, as far as the appearance of the American flag on the ocean is concerned, it is not so doleful when the reasons therefor are considered. From a pure sentimental standpoint there can be no difference of opinion and but one conclusion can be drawn. On the question of sentiment, all people in this country are united and everyone has the same desire to see that the stars and stripes again appear on the ocean in every quarter of the globe, if this object can be attained. Leaving aside all sentiment and coming down to the mere fact of the decrease in shipping and its causes, then it is not so doleful to know that the prosperity of the United States, the increase in agriculture and manufacturing has been so great as to enable the payment of higher wages than the international scale of wages of the maritime nations permits of.

"The cause, therefore, of the decline in shipping is, in this respect, one that while it necessarily deprives the country of a larger mercantile marine, on the other hand it is a matter of congratulation that the country can employ labor at so much higher price than any other nation of the world. I am also of the opinion that so far as the majority report referring to the resolutions passed in important cities in the west, like Denver, Omaha and Milwaukee, is concerned, that the true fact of the decline of American shipping may not be known to them, and that the New York Board of Trade and Transportation should therefore endeavor to give them a reason for the decline in shipping in all details before judgment can be passed as to its remedies and its effect upon business in general. Having in my mind that a full investigation of the reasons of the decline in shipping should be made before it is possible to recommend a remedy, I submit the following points, which it seems to me are largely the cause of the decreased tonnage of the American merchant marine:

"First of all, we have the question of price of labor in manning the ships or in building them. In this country the number of able-bodied men willing to go on the seas at the price this labor commands is limited. We have not got a population like they have in England, Scandinavia or in Germany, where the love of the sea is inborn, and where for generations families have been following the same pursuit. To them the price paid does not appear low as compared with the price labor commands on shore, and with a natural desire to follow the calling of their parents a large number of able-bodied men, born and raised on the seashore, acquainted with the perils of the seas, and fully aware of the hardships, is available; and it is for this reason that a number of aliens and foreign-born citizens are manning our navy. In the United States we are missing this element, and but a small proportion of the population living on the seaboard can be found willing to take the wages offered, and willing to undergo the hardships and perils connected with seafaring.

"The price of building ships could in time be overcome. This country has already built men-of-war for other countries, and as is the case in anything connected with the building of machinery, the manufacturers of this country, in all other lines, are able to compete with Europe on neutral ground, the building of ships should therefore be within our reach as well. If we construct all sorts of railway material, harvesters, pumps and elevators, and many other lines in which the chief material is iron, steel and wood, and in which labor is fully as high as in ship building, and we are able to sell these in all parts of the world, I think ships will be built here as low as in Europe, but when it comes to manning the ships, from the captain and engineer down to the common sailor, the country is at a great disadvantage. The navigation of ships is entirely international; the competition has to be outside of our own territory and we have to meet the world at large.

"Another serious disadvantage in running ships, that is to say, regular lines, is the fact that we export in bulk such an enormous amount of tonnage and import such a small amount compared with the export. In order for ships to be run successfully and reasonably there should be a freight both ways, which, with very few exceptions, is not the case. With a scarcity of tonnage, like the time from 1898 to 1901, the time of the Spanish-American war, the Boer war and the Chinese trouble, rates may become profitable again. It is simply a question of supply and demand which cannot be overcome or controlled by the largest capital in the world, viz., the international marine enterprise of J. P. Morgan & Co.

"Government aid has been given in France to the shipping interest, and instead of improving and increasing it the French commercial marine is in utter decay. The subsidies are so large that a French sailer came in ballast from San Francisco to New York to accept a freight from New York for another long voyage simply for the mileage earned from the subsidies of the government for sailing vessels. It has been shown that ships were built for the subsidy and not the trade. Low freights and sharp competition will tax the ingenuity of the builders for new appliances and economies and compel the owners to have their boats built after studying the interests of the trade for which they are intended. The most successful steamship lines in the world have not been created by subsidies but by the progress of the lines; by the ingenuity of the builders; by the knowledge of the trade for which they are intended, and by endeavoring in every way to increase the business by good service for both passenger and freight trade.

"After dwelling upon some of the reasons why our mercantile marine has declined I do not consider myself in a position to suggest a remedy. Our enlightened statesmen in the house of representatives and in the senate will no doubt be able to consider the situation in its proper light and suggest meas-

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ures for the future which may increase our mercantile marine without detriment to other interests of the country. At the same time, I think the New York Board of Trade and Transportation should add to its representations that there is ample tonnage in all parts of the union to carry the product of the farmers and the factories to all parts of the civilized world where it is wanted. The rate of freight for this tonnage is regulated by supply and demand and international competition from the whole world, and any measure to destroy this competition may be hurtful to the interest of the producers of this country whether these products consist of farming or manufactured interests.

"Great Britain has been in the past, is now, and will remain for many years, the all-powerful nation on the ocean. Not more than about 5 per cent. of the stupendous British steam tonnage is subsidized, and this subsidy is for postal service only. The advantages possessed by this country in agriculture, mining and other resources enable the United States to sell to Great Britain $600,000,000 yearly, against $100,000,000 of imports—a trade balance of $500,000,000 with Great Britain alone. Is it wise from a political and economical standpoint to enter into the mercantile marine question without considering the fact that the prosperity of the principal customer is essential to the prosperity in the United States? A fair competition for mercantile honors on the sea is quite different from forcing the issue through government legislation and aid to the losing business. Of the three great European commercial and financial powers England and Germany are leading the mercantile marine without government aid, France, on the other hand, granting liberal government subsidies, is losing ground; neither her ship builders nor her ship owners have made the progress required to compete with the world at large. Is this country to follow France in her policy of building up a mercantile marine?"

In this argument Mr. Sielcken overlooks the fact that Britain has the same trouble in manning her ships that the Americans would have. A very small per cent. of the crew of British ships are British-born and the reason is the same as obtains in this country—shore duty has more attractions and better pay. But men can always be found to undertake work, no matter how hazardous or unpleasant. In the commoner occupations of mankind no calling begs for men provided the race limit be not drawn. In the lower ranks there will always be more men than jobs, and if an American merchant marine worthy of the name were created there would be no trouble in securing crews from seafaring countries, even if none were to be obtained here which is extremely unlikely. The point he makes that shipping, by which term he means that which is carried by vessels, has not declined is true but the profit on the carriage has gone into other pockets when it might as well have gone to American pockets. Of course it is true that unless a venture is commercially sound subsidy cannot make it so. The shipment of goods from the United States is a commercially sound proposition and all the American ship owner wants is a little aid to overcome the natural handicaps against which he is now laboring. Subsidy in itself would not enable him to thrive. The reason that the merchant marine of France is in a declining state is because it is quite clear that the ship owners are trying to earn the subsidy alone and not to extend trade. They are not engaged in the serious business of the world and deserve to perish. Possibly the reason for this failure is bred in the bone. The French are not a maritime people. They do not take to the water like the purely seafaring countries. England is pre-eminently the maritime country of the world because it has to be. Mr. Sielcken's contention that Germany pays no subsidy is indirectly wrong. She allows a differential on the railways on goods intended for export in German ships.

MANCHESTER AND CANADA.

A very interesting article upon trade with Canada is published in the Manchester (Eng.) Evening Chronicle, which naturally is interested in any phase of the subject that might promote trade with Manchester direct. The three principal lines running between England and Canada are the Allan, Canadian Pacific and Manchester Liners. All of these carry an enormous quantity of cargo for Manchester but in only one case—the Manchester Liners—do the steamers trade direct to Manchester. The reason is that in carrying passengers it would be impracticable to continue the voyage from Liverpool.

"But there are now currents at work," says the Evening Chronicle, "that may force both the Allan Line and the Canadian Pacific to make Manchester a terminal port. The explanation may appear a little involved. As everybody knows the Canadian Pacific railway is one of the most powerful enterprises in Canada. At the present time it is the sole means of getting traffic to St. John, which shares with Halifax the distinction of being the only Atlantic ports open during the winter months. This is a significant fact to bear in mind. It means that nearly all the freight shipped by these three steamship companies passes in the first place over a portion of the Canadian Pacific railway. Here then is a situation of clashing interests—a situation which by virtue of this circumstance must inevitably give rise to departures with which more or less of the prosperity of Manchester will be bound up. The Canadian Pacific railway, it should be understood, exists obviously for its own benefit. It is, therefore, not to its advantage that traffic conveyed over its railroad and consigned to England should be shipped by rival lines. The C. P. R., as it is commonly called, not only sees this, but is already doing its best to appropriate all freight which it handles to itself. We have witnessed how in later years this ambitious and finely-managed company has built both cargo and passenger ships of its own, and we have observed how it has wrestled a goodly share of the ocean traffic from the Allans, whilst cultivating entirely new sources of freight. So keenly have the latter felt the competition that they have had to divert several of their steamers from St. John, and run them only from Halifax. But the Canadian Pacific railway is not satisfied with the success it has so far achieved; it aims at attaching a great deal more of this remunerative western ocean traffic. In order to be better able to do so it would find it necessary to run the steamers direct to Manchester, especially in view of what an admirable distributing center this is for cattle. Just now the Manchester Liners have the traffic all to themselves, so far as regards this port, and the new service which they have been able to offer has helped considerably to increase the trade between Canada and Manchester. But then the C. P. R. does not see why, if Manchester Liners find it profitable to run to Manchester, it should not meet with the same fortune, the more particularly when it has control of the freight at the outset. In the near future then it may be expected that the steamers of this vast concern will navigate the ship-canal. Linked with this possibility there is the further one of the Allans coming to Manchester for quite different reasons. It is an open secret that this firm has long been dissatisfied with the facilities afforded at Liverpool, and since the commencement of the new ship-canal docks they have been seriously debating the advisability of throwing in their lot with Manchester. Again, the ever growing trade of Manchester with Canada and its suitability for the freight, both as a consuming and distributing center, have risen as additional incentives to persuade the Allans to take such a step. But it may be safely asserted that this will not be until their great rival, the C. P. R., moves first in the same direction. Even so, it becomes but a question of time before Manchester shall have three important and distinct connections with Canada. Of course whilst on this subject the possible influence of the transcontinent line projected by the Grand Trunk railway should not be overlooked. It is very probable that St. John will be made the terminal port, and in this event the Allans and the Manchester Liners would be able to fight the Canadian Pacific railway, whereas at the present they are comparatively helpless. The result anyway would be to the advantage of Manchester, for a second railway line would mean more freight for England and more freight for the ship-canal."

INTERPORT COMMERCE OF THE PHILIPPINES.

The bill regulating trade between ports in the Philippine archipelago contains the following provision:

"That until July 1, 1904, the provisions of law restricting to vessels of the United States the transportation of passengers and merchandise directly or indirectly from one port of the United States to another port of the United States shall not be applicable to foreign vessels engaging in trade between ports in the Philippine archipelago."

The house committee on the Philippines points out that the interport trade of the Philippines is carried on by vessels belonging to the inhabitants and in foreign bottoms, and that to prohibit this traffic, according to the above provision, would virtually cause commerce to become stagnant in the islands. The committee, therefore, recommends that the time be extended to 1906. The committee adds:

"There is an American tonnage now in existence, and to which additions are constantly being made, amply sufficient to provide for all the trade between the Philippine archipelago and the United States, either by way of the Pacific or via the Suez canal and the Atlantic. In regard to the interisland traffic, however, the conditions are widely different. That commerce is carried on almost exclusively in vessels belonging to inhabitants of the Philippines, or to foreign owners, and most of it is carried in foreign bottoms. Under these circumstances, if the provisions of existing law should go into effect on July 1, 1904, without the change being made which is proposed by this bill, the entire traffic between the ports of the islands would be completely arrested, because practically none of the vessels now engaged in the interisland traffic could conform to the coastwise laws of the United States. This would be a blow to the prosperity of the islands, and cause not only great inconvenience and hardship, but would practically paralyze all interisland commerce. It is therefore absolutely necessary to relieve the interisland traffic from the application of the coastwise laws of the United States upon July 1, 1904."

Rumors that Mr. James Gayley, vice-president of the United States Steel Corporation, has resigned or is to resign shortly have been in circulation for three or four weeks past. Mr. Edwin S. Mills, assistant to Mr. Gayley, and who was prominent in the management of affairs of the Carnegie Steel Co. on the great lakes just before the formation of the Steel Corporation, gives up his connection with the big organization Jan. 1.

Senator Hale, chairman of the senate committee on naval affairs, says that it is the intention to provide for another liberal addition to the navy at the present session of congress. He says that when the additions already authorized are completed the United States will have a more powerful navy than any other nation, except Great Britain.

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LABOR SITUATION ON THE LAKES.

All of the elements subsidiary to the operation of lake vessels, that is masters and mates, engineers, wheelsmen, watchmen, stewards and firemen, are getting their affairs into shape so that each may have a definite program and plan of action when the time comes for taking up the matter of contracts with the Lake Carriers' association if that body is itself strong enough in another year to act for the great bulk of the vessel interests. Of course most of the vessel owners are now saying that they are not borrowing trouble as yet on the score of their dealings with labor, as the outlook for another season's business is such that a long delay in starting would not be at all surprising and might be welcomed from the standpoint of better freight prospects in a short season. In union circles difficulties with the owners are not looked for as no radical demands are talked of. While it looked, indeed, a few months back as though the masters and engineers would clash on the question of recognition, the situation now, dictated very largely by the state of industry, has completely changed. Sober counsels will probably prevail in the different organizations representing the men that operate the vessels. It is well known that the trouble between the masters and mates and the Pittsburg Steamship Co. was brewed on shore, while many of the older and cooler heads were sailing. There is a movement now on foot to abolish the shore organization, to do away, in fact, with the business agents. The desire is to settle affairs in the spring and close the offices of the association during the sailing season. Were this policy pursued undoubtedly a thing that was settled at the beginning of the season would remain settled during the entire season. Another new sign has appeared, and that is the breaking down of opposition among certain of the masters against the policy lately pursued by the owners employing the engineers. There are two great divisions to the ship, commonly known on board as fore and aft, or in other words, the deck crew and the engine-room force. The owner in employing the chief engineer does not intend to diminish the authority of the master. The captain is the master of the ships at all times and it is upon his judgment that the operation of the ship must depend. As far as can be ascertained labor does not intend to be unreasonable in its demands, and so the outlook is for smooth sailing during the coming season. Unfortunately, however, the volume of business may be very much below that of the past three or four years, and in this there is little comfort for either side.

DULUTH GRAIN AND FLOUR MATTERS.

Duluth, Minn., Dec 30.—Stocks of all grains at the head of Lake Superior increased about 500,000 bu. last week. Wheat is coming in more freely than a year ago. Stocks of wheat increased 242,000 bu. in the week, or 200,000 bu. more than the same week last year. Flax is also coming in quite well. The general supposition is that country elevator companies are cleaning out their houses and preparing to close them down. Stocks of contract wheat are growing quite rapidly at the expense of special bins, a good deal of the latter coming out of Great Northern private houses. It is generally supposed here that the control of flaxseed by the leading interest in that trade is very complete, and that it is taking what comes in and is for sale. Some 8,000 bu. of flaxseed was shipped from here all-rail to Minneapolis the past week. Stocks of seed in Duluth-Superior elevators now amount to more than 5,000,000 bu. and are about twice as large as last year; in fact twice as large as at any previous time in the history of the trade.

The fate of several of the large flour mills at the head of Lake Superior will probably be settled within a few days. When the ill-fated and over-capitalized United States Flour Milling Co. bought these mills for large cash considerations they were all running and apparently making money. Several of them were closed by that company and have never been run by it or by its successor, the Standard Milling Co. The company had five mills, one at Duluth, three at West Superior and the same number at East Superior. For more than a year, and probably for considerably longer, only three have been operated, and these not continuously. Two-thirds of the capacity has been permanently idle, and the rest has probably not made more than half as much flour as if it had been possible to operate full time. All-rail freights from the head of the lakes in winter months tend to make winter operation very difficult for mills that have so much of an output that they cannot sell a considerable part of it nearby. There has been no time during the past two years when the Standard Milling Co. would not have been happy to receive an offer for either the Duluth Imperial, the Grand Republic, the Minkota or the Listman. The Imperial is said to be a structure too weak to permit heavy grinding, and the Grand Republic has been emptied of much of its machinery. This was an instance where combination did not improve conditions.

CHICAGO GRAIN ROUND-UP.

Chicago, Dec. 30.—Readers of the Review may be interested in a sort of a wind-up of the old year conditions connected with storage inquiry, grain movement and stock figures. There is some inquiry on the part of shippers for winter storage loading and 2¼ cents on corn for Lake Erie ports is suggested as a figuring basis. No charters are reported thus far and the few vessels in near readiness seem disposed to hold for better offerings.

The final figures given by the agricultural department on the grain crop of 1903 show some reduction from the crop of 1902 and compare about as follows:

	Season of 1903. Bushels.	Season of 1902. Bushels.
(Winter wheat)	399,867,000	411,788,000
(Spring wheat)	237,954,000	258,275,000
Total wheat	637,821,000	670,063,000
Total corn	2,244,000,000	2,524,000,000
Total oats	784,000,000	988,000,000
Total barley	132,000,000	135,000,000

The total lake and rail shipments out of Chicago are thus reported:

	Since Jan. 1, 1903.	Same time last year.
Wheat, bu.	24,162,000	30,181,000
Corn, bu.	89,741,000	45,010,000
Oats, bu.	62,904,000	57,445,000
Barley, bu.	2,872,000	3,472,000
Total, bu.	179,679,000	136,108,000

Stocks of grain in Chicago elevators are thus reported by the board of trade:

	This time.	Same time last year.
Wheat	5,994,000	11,488,000
Corn	4,221,000	2,590,000
Oats	3,448,000	3,063,000
	13,663,000	17,141,000

CANADIANS WANT CANAL DUES ABOLISHED.

Some radical changes in Canadian shipping regulations are being urged by the Dominion Marine association. The executive committee of this association has just closed an important meeting. The real work of the committee was confined to preparations for the annual meeting to be held in Ottawa. The general feeling of the committee was that the extraordinary industrial progress of the Dominion is in advance of the present marine laws. Evidently the progressive men in shipping lines in Canada are determined to secure legislation that will put Canadian vessel owners on an equality with vessel owners in the states. An important subject of discussion was the abolition of all canal tolls and the keeping of the canals open on Sunday. At present everything that does not have to move stands still in the Dominion on Sunday. The government has, of course, suspended canal tolls for two years, but the vessel men point out that permanent benefit depends upon the absolute abolition of all tolls; that no large concern will undertake investments that rest upon an enlarged business on the lakes when the dues may be reimposed within a few months. Again they declare that navigation is naturally brief on the great lakes and that it should not be made briefer by eliminating one-seventh of the available time. They assert that the Erie canal is never closed. The question of harbor dues and government wharfage is another subject for amendment. It was asserted that the dues at present frequently exceed the freight revenue where a vessel has but a small cargo to deliver. Then again vessels sometimes desire to put in at night or during stress of weather and it is argued on this score that charges should be regulated from a more practical standpoint. It was also declared that the government should make some arrangement, fiscal or otherwise, for the encouragement of ship building in the Dominion. President C. F. Gildersleeve of Montreal, who presided, gave out the following interview:

"The association is anxious to see the St. Lawrence the unrivaled highway to the seaboard, not only of Canada, but of the northwestern states. The principal step in that direction is the enlargement of the Welland and St. Lawrence canals. With the Welland canal deepened and improved, the big steamers now

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carrying grain to Buffalo would become feeders to the Canadian route, because on the Canadian route steamers up to 6,000 tons burden could make a voyage of 1,100 miles and then tranship to a barge of 2,000 tons' burden for transportation to Montreal, when by the Erie canal route the big grain steamers could carry grain and other western freight only to Buffalo, 900 miles, where it would have to be transferred to 1,000-ton barges for 450 miles to New York. The barge transportation by the Canadian route would only be a matter of 170 miles."

SILAS HITCHCOCK—AN APPRECIATION.

It has probably never occurred to Silas Hitchcock that he has been all his life setting an example to business associates. But such, indeed, has been his office and he is still pursuing it. His magnificent management of affairs with the firm of M. A. Hanna & Co. has been a source of inspiration to those around him and an example which all might emulate but none improve. It was a common remark that Silas Hitchcock had a superb grip on the business. During office hours he became grounded in it to the complete exclusion of everything else and he rarely took a day off. His business was his life. He was as methodical as a machine and as self-contained as the sphinx. He dispatched an enormous amount of business daily without apparent effort and without haste. Cool, courteous and decisive, and always exceptionally well-groomed, he impressed one as a masterful man. There is a tradition that no one but a member of the family may become a member of the firm of M. A. Hanna & Co., but Hitchcock broke this rule some years ago through the sheer force of his ability. The firm was delighted to have him as a member.

Silas Hitchcock is still a young man as years are commonly reckoned and this is his second and crowning example. He has determined to retire from active life while in the full possession of all his splendid faculties and before the close pursuit of business has withered the capacity of extracting pleasure from other modes of life. As far as means are concerned he very probably has more than he will have need of; still, how many men are in that same boat and merely continue to heap dollar upon dollar. But here, sirs, is a man to tie to, who appreciates a good dinner and the fine points in a collie dog, who has an acquaintanceship with literature and a taste for a song, who can tell the merit of a painting and, in fact, has eyes which are not sightless and ears that are not deaf; and moreover has the ability to enter the marts of trade and wring an ample fortune from it before he is forty-seven. Of course others have done the same as far as wealth is concerned but how few have his mental poise. The common end of the money maker when he ceases money making, through the inevitable blight of age, is rust. Therefore, how much better is one Hitchcock than a whole regiment of the rest. The Review is constrained to make these few remarks because this week Mr. Hitchcock retires from active connection with the firm of M. A. Hanna & Co. and because it has watched his expansion with increasing respect during the past fourteen years. What greater tribute can be paid to any man than this, that when his determination to retire was announced every one who had any knowledge of his wide command of affairs asked, with one accord, what man there was in the business who could be compared to him.

Mr. C. C. Bolton, also a member of the firm, who has been in charge of the pig iron department for a great many years, retires this week. Mr. Bolton is an older man than Mr. Hitchcock, but like Mr. Hitchcock is a man of many parts and desires leisure to enjoy himself after many years of arduous labor.

Mr. R. L. Ireland, formerly vice president of the American Ship Building Co., becomes a member of the firm on Jan. 1. He has had an unusually successful career as a business man and is, moreover, connected with the Hanna family through marriage.

PROBLEM OF THROUGH CARRYING TRADE.

Buffalo, Dec. 28.—The lake season just closed seems not to have solved any new problems, though it has made more plain than formerly some decidedly unpleasant changes that were mostly in sight sometime ago. Among them are the growing uncertainty of the profits of the individual, and especially small, vessel owner, the giving out of the lumber supply available to the lake fleet, the continued control of ore, and in a less degree of coal, and in a still less degree of grain and package-freight carrying. The encroachment of the labor unions is unabated and forms a great problem in itself.

Of course the problem that most concerns Buffalo as a locality is the future of the great east-and-west through carrying route. It was in order to enable us to maintain all of the former lead and to increase it at will that we labored so strenuously for the 1,000-ton barge canal and we believe that with the watchfulness that will be given it after so far succeeding it will in good time insure the lead that the route naturally commands. Let other routes go on as best they may. There is only one that can do us any great harm and that is the canalizing of the streams and lakes from Georgian bay to Lake Ontario through the Trent valley, and it is even then a problem as to results, for the great cost and the short season are both very seriously against it.

The great advantage of the improved Erie canal is that it does not contemplate the uniting of the lake and ocean trips into one. Any plan that makes that attempt must fail in the long run, if not at the outset, for a transfer of freight is easily found to be cheaper than the extra cost of using a ship-canal, to say nothing of the extra first cost. So far the St. Lawrence system is halting between the two and runs the risk of not making the most of either. The cutting off of weeks at both ends of that season more than has to be taken off here, will always be a great handicap, no matter what the advantages may be.

Still Canada seems to be willing to make any outlay in order to carry the experiment on, especially since the apparent recent gains over us have been made. We hear from elevator builders and others coming back from Montreal that even with the magnificent new marine public works of the water front there the plan is far from carried out as yet. It is not enough to elevate the grain, but it must be taken down to the wharf level again and carried at great distances to any point that may happen to be occupied by an ocean steamer, for the steamer takes but a jag of grain anyhow and declines to go after it. There is a rise of over 30 ft. of the water level to be taken account of as one of the local problems. Suppose Buffalo and New York should take upon themselves such improvements. Where would any other route be in a short time? Buffalo is in a fair way to need more elevator room soon, but there is nothing doing in that direction. Much grain is diverted from here every season on account of the elevators filling up, though the rail shortage is the main difficulty. This the barge canal will correct, as we look at it.

Then suppose New York should provide a system of dock conveyors to bring the grain to the ocean steamers and then operate them at a nominal profit. Would there not be a revolution in the business very soon, barge canal or no barge canal? For Buffalo has again demonstrated that in spite of indifferent crops and all the diversions to other routes we hear so much about, she is holding her own in the carrying trade of the lakes. The total of 129,732,092 bu. of grain received by lake during the season just past is 16,526,006 bu. more than was received in the season of 1902. It is a small advance, but it is enough. The Sault route has seriously fallen off. Had it been up to former seasons, Buffalo would have shown a magnificent increase.

And all this, let it be noted in favor of the Buffalo route, with nothing new in its favor. The barge canal is ten years away and it is said by railroad men that when it is finished it will be as far behind the roads as the old 8,000-bu. boat is now, yet it seems that this route is always either best or such a stimulus to other routes that they are obliged to exert their utmost ingenuity and make their utmost outlay to do business in competition. So it would seem that this is the great cheapener of through traffic.

There is a new competitor in the flour trade that the lakes themselves should look to and that is the solid train from Minneapolis, which is making great headway of late. Odd as it may seem the lakes make their greatest point against the roads from their speed and not from their cheapness. The roads are learning this.

JOHN CHAMBERLIN.

DULUTH GRAIN SHIPMENTS.

Duluth, Minn., Dec. 30.—The following statement of grain shipments from Duluth and Superior, season of 1903 was prepared in the office of G. A. Tomlinson, vessel owner:

Grain.	Bushels.
Wheat	26,682,020
Barley	5,782,047
Flax	15,417,285
Oats	4,104,122
Rye	809,794
Total	52,795,268

Shipments of the different grains by months were as follows:

	Wheat.	Flax.	Barley, oats and rye.	Total.
April	2,312,742	1,245,239	1,300,814	4,858,795
May	2,304,822	1,155,282	863,060	4,323,164
June	1,321,129	686,907	161,679	2,169,715
July	1,554,500	1,229,141	546,406	3,330,047
August	419,189	1,063,869	108,969	1,592,027
September	2,945,181	775,795	990,938	4,711,914
October	6,144,026	3,415,979	2,646,889	12,206,894
November	8,099,311	4,750,115	2,849,692	15,699,118
December	1,581,120	1,094,958	1,227,516	3,903,594
	26,682,020	15,417,285	10,695,963	52,795,268

The season of grain shipments was April 5 to Dec. 8.

The turbine steamer ordered by the Lake Ontario Steamship Co. for the Toronto-Hamilton run is expected to be on the route in June, 1904. She will be 260 ft. long, have engines capable of developing 3,500 H. P., which will give a speed of 20 miles an hour, and will have accommodation for 1,700 passengers. It is expected that three round trips a day will be made.

The ship yard of the Townsend-Downey Ship Building Co., Shooter's Island, N. Y., has resumed operations in part. There is considerable repair work to be done. The plant ordinarily employs 1,700 men and there are now about 600 at work.

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LOCK DIMENSIONS FOR ERIE CANAL.

Canal transportation interests, boat owners and others are discussing at present certain features of the New York canal improvement act which they claim should be very carefully considered before the work is actually carried out. The provisions that are attracting particular attention relate to the dimensions of locks, the depth of water over miter sills and the height of all fixed bridges above the water. It is believed by some that if the locks are constructed of the minimum dimensions specified in the act they will not be sufficient to accommodate 1,000-ton barges or boats which can be loaded with 1,000 tons of freight. Wider locks are being urged. Furthermore the point is made by practical canal men that a depth of only 11 ft. of water over the miter sills of locks means for practical purposes only 10 ft. and that the latter would be the maximum draught that any boat could have and be locked through with safety. As to the specification regarding fixed bridges that is also declared to be inadequate and boatmen believe that the proposed barges would have difficulty in passing beneath them unless they are built a great deal higher above the water level than the act contemplates. The exact language of the law with relation to the dimensions of the locks follows:

"The locks for the passage of boats on the Erie, Oswego and Champlain canals shall be single locks, except at the flight of three locks near Waterford and of two locks at Lockport, which shall be double locks. The locks shall have the following governing dimensions: Length between hollow quoins, 328 ft., clear width 28 ft., minimum depth in lock chamber and on miter sills 11 ft., and with such lifts as the state engineer may determine. The locks shall be provided with all necessary approach walls by passes, gates and valves, with hydraulic or electric power for the manipulation of gates and valves, for expediting the passage of boats through the locks and for lighting the locks and approaches. All locks having over 8 ft. lift shall be fed through a culvert running parallel with the axis of the lock in each wall with the necessary feed and discharge pipes and controlling valves. All single locks shall be so located with reference to the axis of the canal, that a second lock can be conveniently added alongside the first should this hereafter be found necessary."

As to bridges, the law says: "New bridges shall be built over the canals to take the place of existing bridges wherever required, or rendered necessary by the new location of the canals. All fixed bridges and lift bridges when raised shall give a clear passageway of not less than 15½ ft. between the bridge and the water at its highest ordinary navigable stage."

Mr. Peter Cahill of New York, one of the most experienced of canal men, in discussing the subject said:

"The length of the locks, as provided in the law, is all right, but there should be three sets of gates in order to save water and also to save time in locking boats through. With three sets of gates, if one pair should give out, the others could be used and traffic would not be interfered with. The proposed width of the locks, however, is entirely inadequate. They should be 35 ft. clear in width, instead of 28 ft. as contemplated. They certainly should not be less than 32 or 33 ft. If they are built only 28 ft. wide, they would accommodate a boat only 27 ft. 10 in. wide at most, and a vessel of that width, and say 150 ft. long, with 10 feet draught, would hardly carry 1,000 tons of freight and get through the locks. In order to carry that tonnage the barge would have to be at least 32 or 33 ft. wide, 150 ft. long and of 10 ft. draught. Furthermore, with only 11 ft. of water provided for in the lock chamber and over the miter sills, we would have, as a rule, only about 10 ft. actually of water over the sills, on account of the wind and shortage of water oft-times. Therefore, while the depth of water in the canal prism itself would be 12 ft., we could only load to, say, 10 ft. in order to be sure of getting safely over the miter sills. There should be at least 13 ft. of water over the sills, even for a 12-ft. waterway, because an allowance of about 1 ft. must always be made for possible lower water at the locks than in the main channel. This matter of increasing the depth over miter sills could probably be arranged easily, because the law provides that the 'minimum' depth shall be 11 ft. The width of the locks is of great importance. We cannot increase the length of the boats beyond 150 ft. and be able to lock two through at a time; besides a barge of greater length could not be handled advantageously, and a long, narrow barge becomes top-heavy when loaded. Then again a 1,000-ton barge will draw about 4 ft. of water light, so that we could load her only 6 ft.; but we could not load to that extent with safety if there was only 10 ft. of water, actually, over the miter sill. We must have more than that.

"As to the fixed bridges, the law states that there must be a clear passageway of at least 15½ ft. between the bridge and the water. I venture to say that no 1,000-ton barge could pass under a bridge not higher than that. Why the sides of those barges alone will be at least 14 ft. high; thus you must allow for 3 or 4 ft. sheer, besides from 5 to 7 ft. more for a cabin. The bridges would have to be not less than 25 ft. above the surface of the water to allow such boats to clear them. In country districts it would be impracticable to build bridges of that height; the farmers would protest against climbing such hills as would be necessary. The solution of the problem, it seems to me, would be to have only draw or swing bridges—no fixed bridges at all."

It is reported in New York that a brief has been prepared on the constitutionality of the 1,000-ton barge canal act and that the document declares the act, which was approved by the people of the state of New York, to be unconstitutional.

GREAT LAKES MARINE IN 1818.

How great has been the change in the merchant marine of the great lakes during the past eighty years is probably well told in the simple statement that an ordinary freight carrier today is of greater registered tonnage than the aggregate of the merchant marine of that time. Mr. J. W. Walton of the Upson-Walton Co. is now preparing to give a dinner to a number of old lake captains and has been in correspondence with them concerning it. Incidentally old times have been rehearsed, and one of the old captains, Capt. Jeffreys of Cleveland, sent him the clipping which is published below. It shows that the total tonnage of the Lakes Erie, Huron, Michigan and Superior in 1818 was 2,068 tons. The list, which follows, is taken from David Thomas' "Travels Through the Western Country," printed in Auburn in 1819. It is stated incidentally that "the steamboat will soon start on Lake Erie."

American Eagle, Capt. William Gaylord, 48 67-95 tons, of Cleveland.
Aurora, Capt. Charles Fitch, 31 69-95 tons, of Sandusky.
Blake Snake, Capt. J. Wilkeson, 21 3-95 tons, of Cleveland.
Boxer, Capt. G. Wilkeson, 16 60-95 tons, of Detroit.
Dove, Capt. H. G. Cooley, 13 55-95 tons, of Detroit.
Com. Decatur, Capt. S. Barney, 49 10-95 tons, of Detroit.
Diligence, 32 38-95 tons, of Presque Isle.
Diana, Capt. Ferris, 8 tons, of Cleveland.
Experiment, Capt. S. Johnson, 29 69-95 tons, of Buffalo.
Erie, Capt. R. Gillett, 77 41-95 tons, of Buffalo.
Eagle, Capt. Joseph Hammond, 28 3-95 tons, of Detroit.
Eliza, Capt. W. Brown, 23 82-95 tons, of Sandusky.
Franklin, Capt. J. F. Wright, 73 tons, of Presque Isle.
Firefly, Capt. W. D. Horton, 24 tons, of Detroit.
Friendship, Capt. J. R. Kelley, 49 10-95 tons, of Cleveland.
George Washington, Capt. J. Burnham, 99 73-95 tons, of Presque Isle.
Governor Cass, 30 58-95 tons, of Detroit.
General Scott, Capt. G. Tucker, 20 28-95 tons, of Sandusky.
General Jackson, Capt. C. Blake, 90 tons, of Detroit.
General Brown, 30 22-95 tons, of Sandusky.
General Wayne, Capt. J. Rough, 85 38-95 tons, of Buffalo.
Hannah, Capt. O. Coit, 48 75-95 tons, of Buffalo.
Hercules, Capt. E. Church, 50 18-95 tons, of Detroit.
Hornet, 10 60-95 tons, of Cleveland.
Industry of Sandusky.
Independence, Capt. J. Brooks, 21 tons, of Sandusky.
Leopard, Capt. J. Baldwin, 21 tons, of Sandusky.
Michigan, Capt. W. Horton, 132 tons, of Buffalo.
Monroe, Capt. M. Connor, 28 70-95 tons, of Detroit.
Maria, Capt. G. Leet, 24 28-95 tons, of Detroit.
Miami, 10 46-95 tons, of Detroit.
Merchant, 21 17-95 tons, of Cleveland.
Nautilus, 23 tons, of Sandusky.
Neptune, Capt. Johnson, 61 60-95 tons, of Cleveland.
Olive Branch, Capt. J. Robeson, 14 19-95 tons, of Detroit.
Commodore Perry, Capt. H. Johnson, 41 50-95 tons, of Presque Isle.
Salem Packet, Capt. R. Ward, 28 tons, of Buffalo.
Buffalo Packet, Capt. G. Cady, 12 tons, of Buffalo.
Paulina, Capt. J. K. Whaley, 27 25-95 tons, of Buffalo.
Pilot, Capt. Thos. Rummage, 27 5-95 tons, of Cleveland.
Perseverance, Capt. T. Johnson, 28 65-95 tons, of Presque Isle.
Ranger, Capt. A. R. Naper, 16 79-95 tons, of Detroit.
———, Capt. R. Eaton, 36 3-95 tons, of Cleveland.
Superior, Capt. J. Richards, 70 93-95 tons, of Presque Isle.
Lucy Jane, 15 tons, of Presque Isle.
Traveller, Capt. C. Brown, 22 23-95 tons, of Cleveland.
Union, Capt. J. Beard, 104 30-95 tons, of Buffalo.
Venus, Capt. Foster, 14 tons, of Sandusky.
Widow's Son, Capt. J. F. Rupley, 40 76-95 tons, of Detroit.
Wasp, Capt. G. Shaw, 18 tons, of Sandusky.
Wolf, Capt. H. Rumsdell, 28 78-95 tons, of Sandusky.

Total tonnage, 1,860.08; add for vessels under 10 tons and omitted or unknown, 300.87; grand total American tonnage on lakes, 2,068 tons.

OHIO CANALS.

A special canal commission whose members are Hon. Allen W. Thurman of Columbus and Hon. L. D. Hamlin of Elyria, in their annual report, filed with Gov. Nash, advance a very pessimistic view as to the outlook for the canal system of Ohio. The commissioners declare that, unless the legislature will make far more generous provision for the maintenance and improvement of the canals in the future than in the past the waterways should be abandoned at once. They assert that the management of the canals, which has cost the state about $15,000,000, by a board of public works whose aggregate compensation is about $2,400 per year, is antiquated and out of date and recommend a complete reorganization of the system of administration. They say that the canals as they are today are absolutely useless, a burden upon the state treasury. The commission recommends that the Miami & Erie Transportation Co. be prevented from carrying out its alleged purpose of operating a railroad along the banks of the Miami & Erie canal.

Mr. Lawrence O. Murray of Chicago has been appointed assistant secretary of the department of commerce and labor. Mr Murray has been known to Secretary Cortelyou for a great many years.

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AROUND THE GREAT LAKES.

The annual meeting of the Licensed Tugmen's Protective association will be held at Toledo beginning Jan. 18.

Five new ore unloading machines are being erected on docks at Conneaut by the Brown Hoisting Machinery Co. of Cleveland.

The wrecked steamer J. Emory Owen, which has been abandoned by Capt. James Corrigan to the underwriters, has been towed from Sturgeon bay to Milwaukee where she will be repaired.

Dr. H. F. Matthewson, formerly stationed at Detroit, has just taken charge of the United States marine hospital at Cleveland, succeeding Dr. J. B. Green, who has been transferred to Havana.

Johnston Bros., Ferryburg, Mich., launched last week a hydraulic dredge for the government to be used primarily in dredging Grand river, Michigan. The dredge is of steel and is 161 ft. long, 36 ft. beam and 4 ft. deep. It is expected that the dredge will be ready for work by spring.

The tugs Sarnia and Protector succeeded a few days ago in getting to the steamer Monarch and the wrecking tugs Favorite and Merrick, which were fast in the ice at Sailor's encampment. They were released and a dispatch to the Great Lakes Towing Co. at Cleveland said they had safely reached Detour.

Maj. J. G. Warren, government engineer with headquarters at Milwaukee, recommends in his annual report an appropriation of $318,581.20 for the construction of four turning basins in the inner harbor of Milwaukee. He suggests that the city of Milwaukee donate the land for the purpose of constructing the basins.

Abram Smith & Son of Algonac, Mich., recently effected the sale of the steamer Luna, from Thomas Ryan of Buffalo to C. Schlatteren of Saginaw. The vessel will be converted into a sand sucker at Abram Smith & Son's yard. The schooner Emma L. Coyne is at the same yard for a general overhaul.

As indicating the commerce of Niagara river below the International bridge, it may be noted that during the past season the draw was opened 5,829 times to permit vessels to pass up and down the river. The figures show that 4,559 propellers and 1,270 schooners passed through the structure. The bridge will be opened at any time during the winter to permit the passage of a vessel if a day's notice is given to the foreman of the bridge.

Pere Marquette No. 20, the car ferry lately completed by the American Ship Building Co. at Cleveland, reached Milwaukee this week after a two-weeks' battle with the ice in Lakes Erie, Huron and Michigan and connecting rivers and straits. A two-days' delay occurred at Port Huron owing to some slight derangement in the starboard engine. The car ferry stopped at Ludington and took on board a train load of cars for Milwaukee.

Officers as follows were elected Tuesday by the Cleveland lodge of the Licensed Tugmen's Protective association: President, Charles A. Bush; vice-president, George Brackett; corresponding and recording secretary, A. A. Stannard; financial secretary and treasurer, Joseph Normand; trustees, Edward Dahlkey, John Ryan, Robert Freeds, Louis Seisler. Joseph Normand was elected delegate and George Brackett alternate to the meeting of the grand lodge, which will be held at Toledo Jan. 18.

Many of the oldest and most respected vessel owners of Cleveland are to be found each year at the annual social event of the marine engineers—the grand ball and supper. Some of them were engineers themselves and they take great pleasure in renewing old acquaintances. For twenty-three years past the annual ball, always successful, has been an event of social importance with the Cleveland lodge of engineers. This year it will be held on Tuesday evening, Jan. 12, at Chamber of Commerce hall.

All kinds of salvage claims are showing up against the burned steamer J. Emory Owen of the Corrigan fleet, Cleveland, which was abandoned to the underwriters at Sturgeon bay and recently towed to Milwaukee. The Ann Arbor car ferry and other vessels that assisted in getting the Owen into port will of course present claims. The crew of the car ferry has engaged counsel to look after their interests, and Adolph Green and Frederick Schwermann have libeled the steamer for $10,000, claiming that as special compensation for their services in extinguishing the fire. They boarded the Owen from a small boat and claim that the crew had deserted her.

The mayor and council of Collinwood, Ont., last week entertained with a dinner at the Globe hotel the masters and engineers of the fleet wintering at that port. For men who are on the water the greater part of the year this attention on the part of the municipal authorities was thoughtful and meet. Mr. Thomas Donnelly was the principal speaker of the evening. In responding to the mayor's welcome he took occasion to compliment Mr. J. J. Long, the president of the Collinwood Ship Building Co., and also Mr. J. Israel Tarte, the latter for the work which he did while minister of public works for the Dominion. The toasts were numerous and the evening was much enlivened with wit and merriment.

Work of installing the arc lighting equipment of the Welland canal is now under way. It is proposed to place an arc lamp of 2,000 candle power, alternating current, enclosed, every 500 ft. along the canal, with six lamps at each lock. Contract for the poles has been given to Joseph Battle of Thorold, Ont., and tenders will shortly be called for the electrical supplies, including arc lamps, transformers and transmission line material. The terminal station is to be located at Thorold. It is proposed to install three-phase circuits for distributing the current to the motors for operating the lock gates, weirs, bridges and yard shops. The Lincoln Electric Light & Power Co., St. Catherines, Ont., has been given a ten years' contract to furnish the electrical energy. The plans for the complete equipment of lighting the canal were prepared by Roderick J. Parke of Toronto.

Joseph R. Oldham, well known in lake ship building circles, seems to take as favorably to a California home as he did to the lakes upon coming from England and has evidently lost none of the optimism and flattery that usually characterized his speeches. The following is from a San Francisco paper: "That some of the best vessels ever built for the United States navy are now being constructed in this state, and that California has a great future as a center of such naval architecture was emphasized strongly by Joseph R. Oldham, the naval architect, in his lecture before the drawing classes of the Humboldt Evening High School upon "Errors in Ship Design and Construction." He declared that he had surveyed iron and steel ships for half a dozen classification societies during the past thirty years, and that he had perhaps examined as many vessels as any man in the world, contending, therefore, that he knew what he was talking about when he said that no better work was ever seen than that now being completed at the Union Iron Works. Part of the credit for such superior work, he said, was due to the officials of the big iron works, part to the eminent naval constructor and much to the draftsmen and workmen. But the speaker affirmed that however much the measure of praise should be divided, some of the greatest ships that ever floated will be built in San Francisco, which he prophesied would become the center of civilization's trade."

SUBSIDIES, HIGH TARIFF, OUR MERCHANT MARINE.

Editor Marine Review: As Mr. Bates in his letter in the Review of Dec. 24 fails to refute my former statements by facts, it would be merely waste of time to reply to his invectives and insinuations, which do not affect me at all or help his cause. It is worthy of note that the partisans of protection by tariff constantly conceal the fact that the United States pays subsidies to mail steamers to the amount of $1,400,000 annually, to partly offset the subsidies of other countries to their mail carriers; and that no foreign country but France pays any bounties to its vessels in the foreign carrying trade. Therefore, as the tonnage of France is but 8 per cent. of the world's tonnage, it cannot truthfully be said that foreigners protect their shipping in the ocean carrying trade, against which United States vessels are unable to compete. The small percentage that enjoys protection affects the general carrying trade so very little that United States tonnage is practically on the same footing with the great majority of foreign vessels. The causes why United States vessels in the foreign trade cannot successfully compete must therefore be sought in another direction.

The equal footing is disturbed first by the higher cost of building and running United States ships, on account of the tariff; second, by discrimination of British Lloyds and underwriters increasing the cost of insurance on hull and cargo. These two causes co-operate in the decline and destruction of our merchant marine in the foreign carrying trade.

The tariff has increased the price of all commodities and consequently also the cost of building and running ships. Under the guise of protecting labor, the tariff is the great legal instrument for enriching a few at the expense of many. Under its influence the exploitation of labor is easier and yields larger profits than under free trade or without protection, and capital is accordingly attracted by it and seeks investment in the protected industries rather than in the carrying trade between foreign countries beyond the jurisdiction of the United States. Therefore the tariff prevents the investment of capital in the foreign carrying trade. Furthermore, the tariff furnishes offices for a multitude of politicians. By artificially raising the price of labor, the tariff causes immigration of foreigners to compete with home labor. Under the tariff workingmen are robbed of their higher wages, as it compels them to buy their necessities at such prices as the big corporations dictate; in the same way, but only on a larger scale, that miners are compelled to buy in the truck stores of mining concerns. All these reasons render it incumbent upon politicians of the stamp of Mr. Bates to devise some means to avert such dreadful catastrophe as the abolition of the tariff.

Discrimination by the British Lloyds and underwriters against United States shipping has been harped upon to excess by Mr. Bates, but he has not discovered during his thirty years of study of the shipping question the main cause on this score. On account of the many disasters that have befallen United States vessels, and which occur daily, the United States has lost its reputation for careful navigation. The stranding of the Paris not long ago under damaging circumstances is still in everybody's mind; and the annual wreck of 400 to 500 United States vessels along our coasts is sufficient evidence of careless navigation to stir up foreigners, because there is no other place on earth where so many wrecks and derelicts are found. The constant desertion of the crews of American vessels in the foreign trade gives luster to their management; and the fact, that examination of ship masters and mates is entrusted to persons little versed in nautical science, whose official head is a boiler maker or machinist, is of itself sufficient to fully explain the distrust and discrimination of foreigners against United States shipping.

JOHN MAURICE.
Civil Engineer and Nautical Expert.

Chicago, Dec. 29, 1903.

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Position of the Cunard Steamship Co.

By An Occasional Correspondent.

So much has been written concerning the desirability of some form of subsidy for ocean steamers flying the American flag that it seems in order to consider in detail the position of the Cunard company, which has recently been given an unprecedentedly large subsidy by the British government. To understand the exact status of this corporation properly, it is necessary to look at its financial condition. The gross annual profits for the six years ended Dec. 31, 1902, averaged £293,235, from which average deductions were made as follows: Depreciation of ships, £105,175; depreciation of wharves, etc., and appropriation to insurance fund, £34,131 = £199,306; leaving an average net annual profit of £93,929.

Out of these net profits an average sum of £21,492 was carried to reserve and insurance fund accounts, and an average dividend of 4½ per cent. was paid on the share capital. It seems apparent from the above figures that the finances of the company have been administered upon very sound lines, and the result of this is shown by the fact that the amounts standing to the credit of the insurance and reserve funds have grown from £323,341 in 1897 to £532,000 in 1902. It may also be pointed out that during the period named nearly £1,000,000 have been expended upon the purchase of new steamers having a total tonnage of about 65,000 tons, and this without increasing the capital account.

At the date of the last report the assets of the company, other than ships, represented the sum of £701,334; deducting from this amount the sum due to sundry creditors and the balance standing to the credit of profit and loss—together £232,401—the net amount represented by these assets was £468,933. The current market value of the share capital is £1,030,000; so deducting from this amount the sum of £468,933, above referred to, the amount left, as representing the valuation of the fleet at the present market price of the shares, is £561,067, or, in other words, less than two years' purchase of the average gross profits. The tonnage of the fleet on Dec. 31, 1902, amounted to 127,000 (including the new steamer Carpathia), so that the sum works out at an average value of less than £5 per ton. This is a very low valuation considering the quality of the vessels included in the Cunard fleet, particularly when it is borne in mind that the recent agreement with the British government has greatly strengthened the position of the company in comparison with its great Atlantic competitors. In the trust deed securing the loan from the government the fleet is valued at £1,990,000. The current market price of the shares—£13 for a £20 share—does not appear to fairly represent the true value of the undertaking.

In the circumstances, it seems desirable to give the chief provisions of the agreement with the British government: 1. The company is to remain a purely British undertaking. 2. The company shall have built with all due speed in the United Kingdom two vessels of large size, capable of maintaining a minimum average ocean speed of from 24 to 25 knots, and the plans and specifications for them are to be submitted to the admiralty for approval. 3. The whole fleet, future and present, must be placed at the disposal of the British government for purchase or hire at reasonable rates.

On the other hand, it is provided that the government shall: 1. Pay for the services undertaken by the company other than the mail contract, the sum of £150,000 per annum for a period of twenty years. 2. Advance to the company, by way of loan, an amount equal to the cost of the two new vessels, but not exceeding £2,600,000; such loan to be secured by a first mortgage upon the whole of the company's fleet, and to bear interest at the rate of 2¾ per cent. per annum. It is further provided that the loan is to be repaid by twenty annual installments, each of which is to be equal to a twentieth of the total sum advanced. 3. Pay to the company in consideration of the carrying of the mails the sum of £68,000 per annum.

With regard to the provision that the whole fleet, present and future, must be placed at the disposal of the government to purchase or hire at reasonable rates, it may be said that this is simply the expression of a right which the government already possessed, but it is qualified by the important stipulation that the purchase price is to be calculated upon the present market value of the vessels, less an allowance of 6 per cent. to cover all depreciation. The company will continue the conveyance of the mails upon the payment of a fixed sum of £68,000 per annum, which is based upon the amount it has been receiving, so that if, during the next twenty years, the mails increase, as they have done in the past, this arrangement will not prove an advantageous one for the company.

The most important part of the agreement, as far as the stockholders are concerned, is that relating to the two new vessels. The cruiser committee, appointed by the government, reported, after careful consideration, that £110,000 per annum would be required by a commercial company towards making good the loss which would be sustained by running a 24-knot vessel in times of peace, and £149,000 per annum if the vessel were 25 knots. The mean between these two is £129,500 and the amount to be paid on this basis in respect of the two 24½-knot vessels would be £250,000 per annum. But the cruiser committee based its report upon the subsidy being granted for ten years only, whereas in the present agreement the term is twenty years, so that the company will in effect receive practically £410,000 more than the total sum estimated by the cruiser committee, namely, £3,000,000 instead of £2,590,000. But, of course, the payment of the amount will be spread over a period of twenty years instead of ten. The company will also derive a substantial benefit from being able to borrow the money required to pay for the two new steamships at 2¾ per cent., and in this connection it is worth while pointing out that the estimates of the cruiser committee were based upon the assumption that the money would have to be borrowed at 5 per cent.

The amount of the annual subsidy is made entirely dependent upon the fulfillment of the condition that both of the two new vessels shall be capable of maintaining a minimum average ocean speed of 24½ knots. In the event of a failure to maintain this speed it is left to an arbitrator to fix the amount of annual payment to be actually made to the company. This stipulation is sure to cause the directors great anxiety, but it should not be overlooked that the plans and specifications for the two new vessels must be submitted to the admiralty, as well as the company, so that the government will take a fair share of the responsibility.

The application of turbine engines to ocean steamships is still in the experimental stage, but it is a somewhat significant fact that a commission has been appointed to consider the question of adopting this form for the two new Cunard ships. It is probable that the new Allan line turbine vessel will be completed in time to furnish valuable data in case this form of engine should be adopted. But apart even from the turbine question, there seems to be a feeling in shipping circles in England that the Cunard company is about to take a very important step somewhat in the dark. The failure of these vessels, involving an expenditure of, perhaps, £2,600,000, would be a great disaster to the company. On the other hand, if the ships should be a complete success, it would unquestionably be of great benefit to the company that it should be in possession of the two fastest vessels on the Atlantic.

The Cunard company has pledged itself until the expiry of the agreement with the British government to remain a purely British undertaking, and has guaranteed that, under no circumstances, shall the management of the company be in the hands of foreigners, or the stock or the ships controlled by persons who are not British subjects. This contract has obviously been suggested by the outcry against the transfer of many tons of British shipping to the Morgan combine and by a clause in the report of the admiralty committee, already referred to, appointed to consider the principles upon which subsidies are, or should be, given to British steamship companies for the retention of merchant cruisers. The clause in question runs somewhat as follows:

"With regard to providing security against the transfer of a subsidized vessel to a foreign flag without the consent of the admiralty, all the estimates given to us by the witnesses were made on the understanding that arrangements would be made for this condition to be enforced. Leaving out of consideration possible alterations of the law, and disregarding as inadequate the suggestion of a mortgage or other charge on the ships, we think that the desired security might be obtained by a scheme by which, during the period of the subsidy, the government would be the registered owner of not less than 33-64ths of each subsidized ship, the management and profits being left wholly to the company, and legal security being taken that all owners' obligations should appertain exclusively to the company." (This is the purport of the clause without its exact wording.)

It must be pointed out, however, as it has been more than once before, that the condition as to remaining a "British undertaking" has little meaning in actual practice under the existing English law, or, to be quite accurate, under the present manner of interpreting it. There was nothing until very recently to prevent any foreigner from buying and holding the shares of the Cunard company, assuming that there were nominees in England for purposes of registration. The White Star Line, for example, is owned by a British registered company, the Oceanic Steam Navigation Co. of Liverpool, whose capital consists of 750 shares of £1,000 each, 742 of which are held by the International Navigation Co. of Liverpool, all of whose shares, except seven, are owned by United States citizens. The difficulty referred to has been overcome by the creation of new "articles of association" (charter) which lay down as a cardinal principle of the Cunard company that "no foreigner shall be qualified to hold office as a director of the company, or to be employed as one of the principal officers of the company," and "that no share in the company shall be held by or in trust for, or be in any way under the control of any foreigner or foreign corporation, or any corporation under foreign control." This, it will be seen, offers a direct obstacle to any such arrangement as that under which the Morgan combine does business under the British flag although an American enterprise. To ensure the operation of this "cardinal principle" the directors have obtained power under the new articles to call upon each stockholder to prove his nationality and title.

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and to compel the surrender of the stock when the proof is not forthcoming or not satisfactory, meanwhile suspending the voting right. These terms seem decidedly drastic, and uncommercial. They are probably unprecedented, although the directors of many English banks have a similar, though not by any means identical power. In these institutions the whole of the capital has never been required, and no share of stock is fully paid. On an £80 ($400) share, for instance, only £20 ($100) has been "called" and paid. Such shares cannot be registered in the name of any new purchaser until he has satisfied the directors of the bank of his ability to pay the "uncalled" balance on each share. This peculiar power entrusted to bank directors appears to be unknown in this country.

Whatever objections there may be from a capitalist's point of view to the rigid restrictions which the Cunard company is adopting to prevent its stock being held by foreigners, they seem to be in harmony with the shipping laws of the United Kingdom. It is the first condition of these laws that a ship shall not be considered a British vessel unless owned wholly by natural-born British subjects, or naturalized British subjects or corporate bodies registered in the United Kingdom. Every British vessel must be registered according to the statute known as the merchant shipping act, but the Morgan combine, composed of non-British subjects, has become the actual owner of British registered vessels, notwithstanding the statute, by merely acquiring shares in corporations registered nominally as British companies. This state of affairs is made possible through the absence in the statute of a clause providing that all stockholders in shipping corporations must be of British nationality.

The Cunard company has now changed the conditions upon which its stock can be held, and its proposal is both reasonable and legal, although inconvenience may arise in the future. It cannot, of course, alter the regulations of other companies, unless it controls them. The proposal that no foreigner shall be employed as an officer of the company, from general manager to engineer on board one of the ships, is not consistent with England's boasted principle of free trade in everything. It is a restrictive regulation, adopted by every protectionist country for the benefit of its own citizens.

The provision that the Cunard company is to remain a British undertaking will not impose any onerous obligations upon it. The Morgan combine is not at all likely to want to buy any more steamship companies, and in the absence of such buyer, it cannot be looked upon as a hardship that the company is required to continue to work under the British flag.

The new articles of association, of course, contain nothing as to the loan by the government for the new ships. But the following clause (86) relates to the arrangement now to be carried out: "Without prejudice to the general powers conferred on the directors by clause 82, they may at any time, and for such considerations as they think expedient, enter into any agreement with his majesty's government, or any department thereof, in regard to the carrying of mails, the building of vessels, the placing of all or any of the vessels of the company at the disposal of his majesty's government, whether by sale, or hire, or otherwise, the working and management of the company's undertaking, the preservation of the company's vessels and undertaking and shares under British control, and in regard to any other matters, whether of a like or different character, which it may seem expedient to embody in any such agreement, and may as a term of any such agreement issue to any nominee or nominees of his majesty's government a share or shares of the company, carrying such voting power, either generally or in respect of particular matters, as the directors shall think fit, and the directors shall have full power from time to time to assent to any modification of such agreement."

This clause seems to give exceptionally wide powers to the directors. In accordance with it, it is proposed to create a new £20 share, to be called a "government share," to be issued only to a nominee of the government. This is, for the government, a great fall from the 33-64ths registered ownership suggested by the admiralty committee, and it is worth noting that the voting power of the government share is not defined, and is entirely at the discretion of the directors. But all this is nothing in comparison with the fact that the government is going to loan to the company about £10,000,000 to build steamers that are not wanted at the present time and that could not be made to pay in the ordinary way; and that the company only gives to the government rights which it has possessed for years—to hire or buy any of the ships of the line when needed for national purposes.

The Cunard company owns eighteen passenger steamers, representing 127,000 tons.

The agreement between the English government and the Cunard company ought to be carefully studied when any plan for properly subsidizing American shipping is being considered by congress. It does not, however, on the face of it, seem to offer any ideas that are worthy of close imitation, because a large payment to a single American line devoted chiefly to fast passenger steamers is not what is needed. The principal object of American subsidization ought to be to aid a number of companies which own freight ships in addition to fast passenger steamers.

LAKE SHIP YARD MATTERS.

Although no work will be done at the West Bay City works of the American Ship Building Co. this winter, on account of the reduction in orders for new vessels, it does not follow that the plant is to be dismantled. West Bay City is not the most favorable point for ship building on the lakes, but with a change in business conditions the yard may still have considerable to do. No new work has as yet been assigned to the West Superior yard, but quite a large force will be employed there on repairs. It is reported from West Superior that a public meeting has been called to see if arrangements cannot be made for the construction at that point of a modern steel freighter to be owned by citizens of the place; this with the view, of course, of providing additional work for the ship yard.

At the Lorain yard of the American company material is fast being put into the big 10,000-ton Wolvin freighter, which is to cost $470,000, and it is expected that she will be out on time early in the spring. While newspapers stated that a number of steamers in different yards are undergoing reconstruction in order to provide them with a greater number of hatches, it appears that none of them is undergoing such reconstruction. Five are having the stanchions and beams of the so-called lower deck removed in order to accommodate the extended reach of the clam-shell unloaders. This reduction in rigidity is being compensated for in other ways.

DEVELOPMENT OF THE HARBOR DELIVERY BOAT.

Decided progress has been made in the past few years in the small boats that are used by merchants in the principal ports of the great lakes for the delivery of supplies to vessels. Despatch in port is, of course, one of the first principles involved in the successful operation of the big freighters of the lakes. Every means is employed towards avoiding even the loss of minutes at docks or elevators. To this end the dealer in fuel, the ship chandler and even the butcher, the grocer and the laundry man has each contributed his share. Floating coal yards in the form of lighters with steam derricks aboard, filling the bunkers of steam vessels while they loaded or discharged cargo, took the place of the slow fuel dock, where a few years ago the coal was wheeled aboard after the steamer had finished with her cargo, and gradually the supply houses, that used row boats in most cases for delivery purposes, found it necessary to provide small quick-running steam vessels. Thus the delivery boat on the water began to provide even better service than the delivery wagon on land. Soon there were many of them in all the principal ports.

The first boats of this kind were largely recruited from the cast-off fleet of small tugs, but as the supply from this source was limited and their up-keep expensive it became necessary to build some small steam vessels for the service. On account of the necessity of carrying licensed officers, and in view also of other running expenses that were quite important, there was a demand for some other kind of boat suited to this work. The development of the gasoline motor for boat propulsion has largely solved the problem. Many of the gasoline boats are now used in the harbor delivery service and some of them are good specimens of their kind. Slips are in some cases so arranged for them that they are run under the supply stores, right up to small elevators within the stores, from which goods are loaded and unloaded.

A picture of one of the latest of these boats, the I-no-u, owned by Hardy & Dischinger of Toledo and recently placed in service, appears herewith. The boat was designed by Capt. D. F. Edwards of Toledo, one of the old-time lake men. She is 38½ ft. over all and 8½ ft. beam. She is heavy. The keel is 5½ by 10 in.; frames 2 by 3 in. at bottom, 2 by 2 in. at top and 12 in. from center to center, with stem and stern post in proportion, and with planking and ceiling 1⅛ in. thick; all of white oak. The engine is of 14 H. P., Lacy Bros.' make, and has given entire satisfaction. The engine is turning a 34-in. two-bladed wheel 324 revolutions a minute and driving the boat about 8 miles an hour. This is the second Lacy Bros.' engine that Hardy & Dischinger have owned. The second order resulted from excellent satisfaction with another engine of the same make in another delivery boat.

Geo. E. Hardy of Hardy & Dischinger is one of the pioneers in the delivery boat line and has a great many friends among lake men who are pleased with his progress in business. Up to five or six years ago he was employed with H. P. Tobey in vessel supply work at Toledo and was well known and well thought of by all the vessel men trading to that port. Then he spent a year or more with the Toledo Rubber Co., following the same line of trade. He was still in touch with the vessel men, and when he formed a partnership in 1899 with F. A. Dischinger to take up vessel supply business he had an acquaintance that was of value. Although started in a small way the business flourished from the beginning and the firm is now among the best known in their line on the lakes. About a third of their business is of a marine kind. Mr. Hardy was recently elected president of the Toledo White Lead Co., a concern that does an extensive business in vessel paints.

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STEAM EQUIPMENT OF A MODERN SCHOONER.

On the big modern tow barges of the great lakes and Atlantic seaboard, as well as the fine schooners built of late years in New England ship yards, steam power has been applied to great advantage for various purposes. One of the technical journals of New York, Machinery, recently prepared, with the assistance of the American Ship Windlass Co. of Providence, R. I., an article illustrating and describing the steam equipment of the latest type of schooners owned on the Atlantic coast.

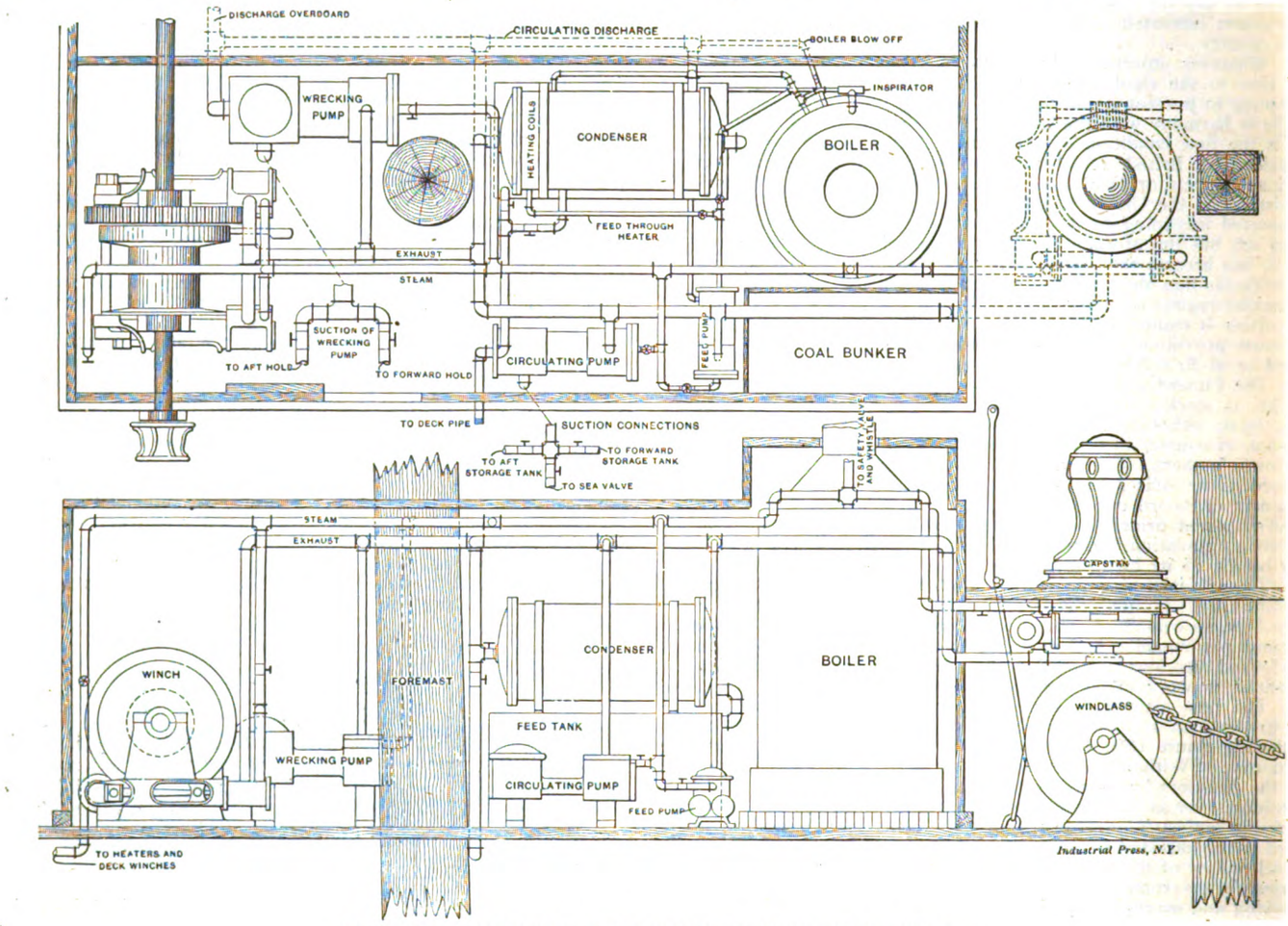

Fig. 1. Plan and Elevation of Typical Steam Outfit for a Modern Schooner.

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Until within comparatively recent times it has been customary for all of the work upon sailing vessels, such as raising the sails, heaving the anchor, etc., to be performed by the sailors; and with an increase of tonnage was required a corresponding

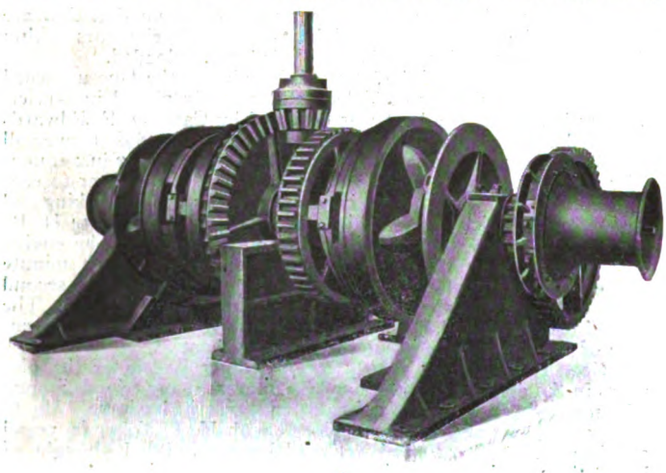

Fig. 2. Providence Elastic Windlass (arranged for Messenger Chain Attachment.) *Patented Sept. 2, 1902.*

increase in the size of the crew, so that one of our present six-masters, had she been in commission a few years ago, would have required a small regiment for her operation. The use of auxiliary steam appliances naturally began upon steam vessels where the power was at hand and was, from the first, used for operating the pumps and later for the windlass, steering gear, ash hoist, etc., etc. Having proved so useful upon these vessels it was not long before it was adopted upon sailing vessels, and at present all schooners of any size are provided with a steam equipment comprising a boiler, used both for power and heating purposes; steam winches, for anchor, sail and cargo hoisting, and an outfit of pumps which forms a complete local waterworks system.

This outfit is located in the forecastle, where room is scarce and the arrangement must, therefore, be as compact as possible. Fig. 1 shows a typical outfit such as would be found on the ordinary coasting schooner. The boiler is of the vertical, tubular type, and should be capable of carrying a steam pressure of 100 lbs., although except when raising anchor or discharging cargo, it is usually run at low pressure for heating purposes. A steam whistle is provided so that safety as well as comfort are ensured.

The principal appliance to be installed in the engine room is the steam winch, which is used for handling the cargo, hoisting the boats and for warping the vessel into dock. The engines are of the duplex type with cranks set at 90°, so that it is impossible for them to get on center. The main drum is friction-driven and provided with a powerful band brake, which is used when lowering cargo into the hold. The winch shaft extends to starboard and port beyond the winch proper and, passing through the sides of the deck house, is provided with small drums, or "ends," over which a rope may be run, forward or aft, for sail hoisting, boat handling, or for warping purposes. On the larger schooners two or three auxiliary winches are often supplied, being placed at convenient positions near the masts.

One of the most important items to be considered in this class of engineering is the economy of fresh water which must, of course, be carried in tanks and every provision is therefore made to prevent any loss. The supply for the boiler is carried in a tank placed in the engine room, while a reserve supply is held in large storage tanks located in the forward and after holds. Upon the top of the feed tank is placed a coil condenser, to which are connected the exhaust pipes from all of the engines and pumps in the system. Incidentally, the exhaust pipe is continued beyond the condenser, under the deck, and connects with the discharge from the circulating pump, so that, in case of accident to the condenser, all of the exhaust steam may be discharged overboard. The first few coils of this condenser are separated from those used for condensing purposes, and are introduced into the boiler feed system so as to form a feed water heater. The remaining coils are connected to the circulating pump, which has a suction connection with the sea valve, and from the condenser the circulating water, as before noted, passes overboard. No air pump is used with the condenser and consequently no vacuum is obtained, as the object of the condenser is solely for water economy. We here find a great advantage in the unlimited supply

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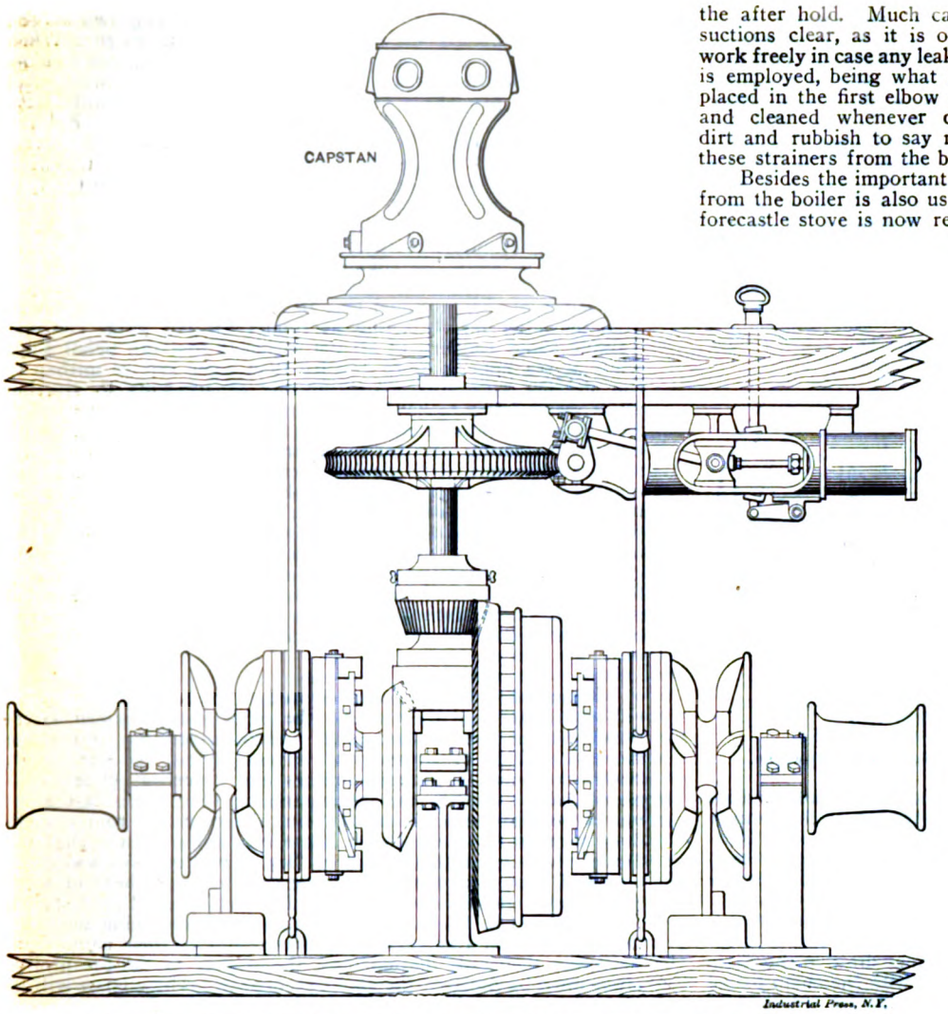

Fig. 3. Providence Elastic Steam Windlass (built by the American Ship Windlass Co.)
Patented Sept. 2, 1902.

of condensing water at hand and this is used without stint in order to effect a saving of the valuable fresh water.

The circulating pump has by-connections whereby the salt water may be cut out and fresh water drawn from either forward or aft storage tank and pumped into the feed tank. This pump is also used for deck washing or fire extinguishing purposes, at which times it is, of course, placed in the salt water circuit. Extending along under one of the ship's rails is a pipe which is provided, at intervals of 25 or 30 ft., with plugs to which a fire hose may be attached, and this pipe is connected with one of the discharges from the circulating pump by means of a flexible hose connection, which is removed when the pump is not in use for this purpose. All of the pipes through which salt water is to pass should be of brass or galvanized iron, as the action of salt water upon ordinary wrought iron pipe is very detrimental.

The boiler is fed by a small duplex steam pump and is also provided with an inspirator, so that either system of feeding may be employed, as desired, and the one arrangement acts as a substitute for the other in case of accident. In the engine room is also placed a larger duplex pump, which is used solely for

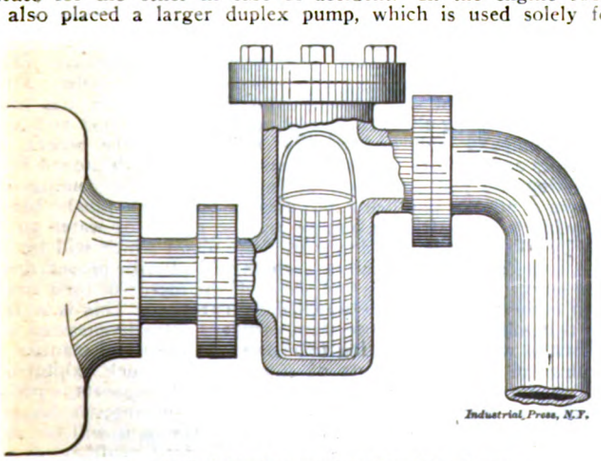

Fig. 4. Basket Strainer used on Wrecking Pump.

wrecking purposes, that is, for keeping the bilge clear of water and when the vessel is leaking. The suction is divided, one part running directly down to the forward hold and the other aft to the after hold. Much care must be exercised in keeping these suctions clear, as it is of greatest importance that they should work freely in case any leaking occurs. A peculiar type of strainer is employed, being what is known as a basket strainer. This is placed in the first elbow of the pipe so that it may be removed, and cleaned whenever desired, and a surprising quantity of dirt and rubbish to say nothing of dead rats, is often found in these strainers from the bilge.

Besides the important steam appliances here mentioned, steam from the boiler is also used for heating purposes, so that the old forecastle stove is now replaced by a modern steam coil and the captain's cabin aft is provided with radiators, and a bath room supplied with hot and cold water. A telephone also is often installed, establishing communication between the cabin and the engine room.

Last but by no means least of the appliances for which the steam equipment is installed, is the windlass, which is situated well forward and carries the two chains by which the anchors are raised. In the construction of windlasses there have probably been more improvements during the past few years than in any other single appliance used upon vessels. Formerly the windlass was operated by a capstan, in the head of which were inserted long capstan bars. These were manned by nearly the entire crew and with a hearty "heave ho" song they tramped round and round until slowly the cable was wound in and the heavy anchor weighed. The picturesque part of weighing the anchor is now passed but the capstan is still retained for use in case of a breakdown in the steam equipment. It may also be entirely disconnected from the windlass, by simply removing a block key. We then have an efficient warping capstan operated directly by the windlass engines.

As soon as it became customary to place a boiler and winch on board of a schooner, arrangements were made for connecting the winch to the windlass, so as to do away with the necessity of manual labor; and this arrangement consisted of placing a sprocket on the winch shaft and connecting it by means of an open link chain, called a messenger chain, to an auxiliary shaft

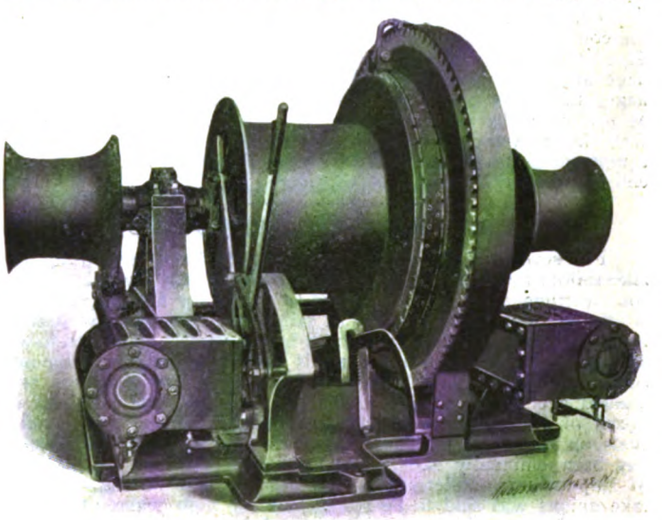

Fig. 5. Steam Winch, 7 by 10 in. (built by American Ship Windlass Co.)
Patented Sept. 2, 1902.

mounted back of and geared to the windlass shaft. Although very serviceable, and still employed to some extent, the arrangement was at best only a makeshift, and gave trouble, owing to the stretching of the chain and its liability to break at just those times that it was most depended upon. A remedy for all of these annoyances was found by arranging for the direct connection of the windlass with an auxiliary pair of engines as illustrated in Fig. 3. Upon the windlass shaft is fixed a large bevel gear, which is driven by a bevel pinion on the vertical capstan shaft. Upon this shaft is keyed a worm gear, which is driven by a pair of horizontal engines, similar to those used on the winch, and fastened to the deck above the windlass. The chains pass over chain wheels, called wild cats, which are loose on the windlass shaft, and when paying out chain, or riding at anchor, their mo-

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tion is regulated by means of friction bands. To raise the chain, block keys are inserted between the wild cat and a driving head which is keyed to the shaft, and when the windlass shaft is driven by the engine the wild cats wind up the chain. One of the latest improvements to be applied to the windlass is the use of elastic wild cats, for the purpose of relieving the strain on the ship, due to its rising on the surges when riding at anchor, and also when breaking out the anchor preparatory to raising. Fig. 6 shows a view of one of the wild cats and illustrates how this is accomplished. Between the driving head and wild cat is placed a secondary head, A, which carries four very powerful coiled springs that act as a connecting medium between the wild cat and itself. When the ship is riding at anchor these secondary heads are locked by means of the friction bands, so that no chain can be paid out. As the surge raises the vessel, the strain that would

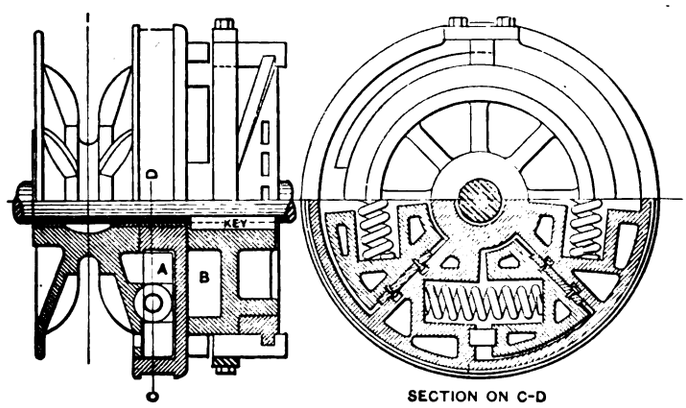

Fig. 6. Section of Spring Head of Providence Elastic Windlass.

otherwise be brought as a sudden shock upon chain and windlass shaft is instead absorbed in a gradual compression of the springs. This greatly relieves the chain and lessens the liability of its parting. In breaking out the anchor the secondary heads are temporarily keyed to the regular heads, *B*, and the elastic principle again comes into play.

It would be practically impossible to provide engines of sufficient power in themselves to pull out the anchor when it is securely imbedded in the bottom, but the engines draw in the chain until the vessel lies directly over the anchor with the chain pulled up taut. As the ship sinks in the trough of the sea the cable is tightened still more, so that as she rises on the succeeding surge her entire buoyant force is exerted upon the chain and the anchor broken out. The elastic movement of the wild cats, is sufficient to prevent this strain from coming as a heavy shock upon the windlass and changes it to a gradually applied load which the windlass is fully capable of withstanding.

Thus the use of steam upon sailing vessels not only adds to the comfort and safety of the crew but has to a great extent reduced the number of men needed to handle a ship of given tonnage and made practical the building of vessels of greater tonnages than was considered possible when all the labor had to be performed by hand. The reduced force needed for handling these larger vessels has made the schooner that has full steam equipment a cheap carrying medium for all freight in which quick delivery does not have to be considered.

SEEN AND HEARD ON THE LOOKOUT.

For several weeks trains from Buffalo have been bringing lake sailors to Jersey City. Most of them having saved last season's earnings, they are not forced to accept the first chance that is offered, or in the vernacular of sailor town "no pierhead jumping for them." Though only south-bound vessels appear to have any attraction for these new arrivals from fresh water, a shipping commissioner stated that the degree of their fastidiousness remained ever in proportion to the size of their "pile." About a dozen of these men were lately discussing the existing conditions on the chain of lakes. From their standpoint the season has been eminently satisfactory, whatever may be the opinion of ship owners, underwriters and others. The strength of the lake unions was said to be responsible for high scales of wages and fabulous are the sums which it is claimed these organizations will force from the pockets of penurious ship owners next summer. Said a former watchman of a Buffalo steamer: "Last August while in Chicago our delegate came on board and I got a calling down for wearing a non-union cap, which I was compelled to throw overboard." As an humble non-union scribbler of what has been "observed on the lookout," I am unable to guess how men voluntarily consenting to such arbitrary rules might define "liberty." In shipping circles on the Atlantic coast one hears the prediction that a tampering with the great lakes' golden eggs—laying goose can obviously only have the proverbial result.

Though it is a generally-accepted fact that nowhere does the sea run higher than in the vicinity of Cape Horn, many masters of coasting craft doubt if weather conditions could be more disheartening than those lately prevalent off Cape Hatteras. The captain of the large ocean-going tug Standard is of the opinion that a vessel weathering this point during the winter months has given proof conclusive of her seaworthiness. Towing two barges, the Standard recently left Jacksonville for a northern port. When off Hatteras, and heading about northeast, it commenced to blow what the tugboatmen called a living gale from the southwest. According to all precedents under such conditions, the flotilla, having a fair wind, should have made excellent progress. But the light barges, presenting so much surface to the strong wind, overran their hawsers, compelling the tug to swing head to the wind to avoid a collision. Heading, then, southwest, and with the tugs powerful engines working full speed ahead, the tow steadily advanced in a northeasterly direction at the rate of 5 miles an hour. This being the direction in which the tow should go, the order was given to work the engines only just sufficient to keep the tug's nose in the wind. And nobly did the two barges acquit themselves of their unusual task of towing a powerful tug stern first, the latter merely acting as rudder for the whole concern. Talking about rudders, of all the accidents that can befall ships while at sea none is more dreaded than some serious mishap to the steering apparatus. An epidemic of accidents to steering gears seems lately to have broken out on the north Atlantic. A Red Star liner was recently forced to put into Queenstown with her steam steering gear out of order. Two British and one German steamer met with similar accidents. These steamers had much trouble in regaining port, while another boat, that some time ago lost her rudder altogether, experienced not the slightest difficulty in making a harbor. This was simply due to the fact of the latter craft being equipped with twin screws and the engineers volunteering to act as quartermasters. Thus we not only have an illustration of one of the advantages of twin screws but proof also of the twentieth century's trend to replace more and more the wielder of the marlin spike by the knight of the oil can.

Means are already being devised to make next summer a red-letter yachting season. To the professional seaman Great South bay of Long island is at present suggestive of nothing more than high cross seas and adverse tides. To yachtsmen, however, it recalls pleasant breezes and numerous closely-contested races. Among the participants in these races last summer were boats of all sizes, ages and descriptions, from a 14-ft. dory to a 40-ft yawl. Under these conditions a tiny, shallow-draught boat sporting a miniature "leg of mutton" sail was often observed, when stemming the strong tide, to forge ahead of some 30-ft. sloop. But another state of affairs will prevail next spring. At Bayshore, L. I., several one-design boats are being built for the Great South Bay yacht enthusiasts, and as their names will constitute their sole dissimilarity, the winner of the prospective series must be declared the ablest yachtsman. These boats will be 26 ft. over all, 17 ft. on the water line, and of 2 ft. draught, exclusive of center board. Having about 1,000 lbs. of lead cast in the keel, the danger of capsizing, even in the strong winds so prevalent on Great South bay, is almost eliminated. With a 24-ft mast, a boom 21 ft. long and a gaff measuring 13 ft., the three men that comprise the boat's crew should be able to handle the 400 odd square feet of canvas spread above them. Though on Long island these craft are termed sloops, the absence of a jib-boom would cause them to be called knockabouts on the shores of Massachusetts. But whatever the name the owners may be pleased to bestow on this particular rig, all mariners are unanimously of the opinion that "handy" is an appropriate term to apply to these embryo aspirants for racing trophies. While it may be true also that the absence of a jib-boom detracts a little from a racer's "smart" appearance, the advantage of carrying practically every stitch of canvas in board can be appreciated by any one who ever hauled a sheet or furled a jib. In short, these boats being as much alike as the proverbial two peas in a pod, it is "up to" their respective crews. May the best one win.

F. H.

ANNUAL SPORTSMEN'S SHOW.

New York, Dec. 31.—The tenth annual sportsmen's show, which will be held at Madison square garden, from Friday evening, Feb. 19 to Saturday evening, March 5, 1904, promises to outdo in interest any of the nine preceding exhibitions. The Sportsmen's Exhibition Co., with offices at 1123 Broadway, under the auspices of which these exhibitions are given, has been reorganized during the past season, and the new blood and vim in the company will undoubtedly redound to the benefit of exhibitors and visitors. Some former features which proved both interesting and instructive are to be restored in the coming exhibition, a notable one being the display of game animals, birds, etc., while a new striking feature will be a lake of water 50 ft wide by 260 ft. in length and 5 ft. deep, about which will be located boat and launch exhibits, each furnished with proper dock, while on the lake exhibitors can show off the merits of their craft or, in other words give an actual demonstration. This is a feature that should be of more than ordinary attractiveness to exhibitors as well as interesting to visitors, as the usual manner of showing off the good points of small craft at such exhibitions is to set the craft on the floor, or prop it up on supports, with an attendant to enlighten interested visitors, or prospective buyers, as to its merits by word of mouth only. Hence it will be seen that the opportunity of displaying a boat's good qualities on the water is a step far in advance of former exhibition methods; especially as the ordinary person, even though desiring to purchase a boat, is not able to distinguish the appropriateness and serviceable qualities of one form or style of boat from another, for purpose desired, without a test on the water. This departure

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from former methods should of itself cause builders of small craft from canoes to power launches to make haste to secure space in the exhibition.

In order to make room for all the new and old features 1,000 sq. ft. more of space will be used than in any previous year, and while the regular daily attendance on the exhibition in previous years has averaged from 6,000 to 7,000 persons, the management has every reason to believe that the 1904 show will draw a much larger patronage. This is but a natural presumption, as with new features, more space and better accommodations for both exhibitors and visitors more interest will be created and more patronage bestowed.

There will be exhibits of water craft, as mentioned, water games, rifle and revolver shooting, camps and guides, Indians and their products, trap shooting, fly coasting, etc. with prizes for contestants. Full particulars, which the Review has not space to give, may be obtained by addressing Sportsmen's Exhibition Co., 1123 Broadway, New York city. G. W. R.

FEW AMERICAN SHIPS IN CUBAN TRADE.

Mr. Henry P. Williams, an American ship master, contributes the following to the Havana Post concerning American shipping with the Island of Cuba. It shows that there are very few American ships, indeed, in the Cuban trade. He says:

"Recently, while visiting Matanzas, I had the honor to address you a few lines with some figures of its shipping trade and of those who did the carrying. To my surprise, I found that out of 1,000,920 bags shipped from Matanzas between Jan. 1 and Aug. 31, 1903, only 47,080 bags were carried under the American flag. It was not my intention, while visiting Matanzas, to investigate or say anything regarding our trade, but on looking over the magnificent harbor there, which in my younger days was full of American vessels, while today nothing of 'Old Glory' is in sight, and I was prompted to make inquiries, and my communications as to their results will end with this letter. Thirty years ago, when trading between New York, Philadelphia, Portland and Matanzas, I sometimes counted at one time in the latter port as many as seventy American vessels, half of them discharging millions of hogsheads and box shooks, coal and sundries, and the other half loading sugar and molasses for the United States. I thought that by going to Cardenas, which we American ship masters in the old days considered one of our own ports, I would find more satisfactory conditions. There was a time when forty to sixty American vessels could be seen daily at Cardenas, discharging and loading during the crop season, namely, about six months of the year. I remember that in those days sugar was shipped in boxes and hogsheads—hogsheads and boxes made in the United States, whence they were transported to Cuba in American vessels. The trade represented $3,500,000 to $4,000,000 per year to our American cooper shops and lumber merchants. It also represented $1,000,000 to $1,500,000 annual freight to the American vessels sailing between the United States and Cuba. The outward business from Cuba was in our hands also. Between the value of the package, the freight inward, and the freight outward, there was an approximation of $8,000,000 per year American trade, which has disappeared. Today the sugar is shipped in bags made in Calcutta, transported from Calcutta to England and Germany, and thence to Cuba, in foreign bottoms, while the sugar is carried in foreign ships to the only country that consumes it—the United States. Out of 952,315 bags shipped from Cardenas to the United States from Jan. 1 to Sept. 30, 1903, only 10,136 bags went under the American flag—approximately 1 per cent. The following is a summary of the transport of those 952,315 bags, and the flags under which they were carried: British, 723,709; Norwegian, 110,732; Spanish, 91,648; Danish, 15,000; Cuban, 11,031, American, 10,136; total, 952,315.

TRADE NOTES.

"Steel and Iron" are the words underneath a very striking calendar issued by the firm of J. F. Corlett & Co. of Cleveland. It is one of the most elegant that has come into this office, and also the most original. It is in bas relief, the subject being the head of an Indian. The colors are brilliant and the work is well done.

The calendar which J. U. Karr of Cleveland has issued this year is one which will attract attention wherever it is hung. While it is only the head and shoulders of a woman it is as conspicuous as a conflagration, so brilliant is the coloring. Incidentally Mr. Karr's business as a dealer in ship supplies is advertised.

Mr. Wilbur F. Powers, 1906 Magnolia avenue, Chicago, has just issued a little catalogue devoted to the Powers system of carrying and launching life boats. He is the inventor and patentee of the system which seeks to remedy present defective methods. The plan of his system is illustrated with drawings and is well outlined.

Some very attractive circulars have been brought out by the Mosher Water Tube Boiler Co., No. 1 Broadway, New York, containing cuts and descriptive matter explaining the great simplicity, compactness, lightness and high efficiency of this type of boiler; also tests of the Mosher boilers by the United States government on the monitor Florida. A number of cuts of torpedo boats and fast yachts fitted with these boilers are also shown, including the famous steam yacht Arrow, speed 45 miles an hour; the Ellide, speed 40 miles an hour, and many other notable vessels. The circulars will be sent on application.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (SEPTEMBER, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	355,560 H. P.
English Royal Navy	929,300 "
Russian Imperial Navy	227,500 "
Japanese Imperial Navy	122,700 "
Austrian Imperial Navy	56,700 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,850,860

Societé Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France. Telegraphic Address: Belleville, Saint-Denis Sur-Seine

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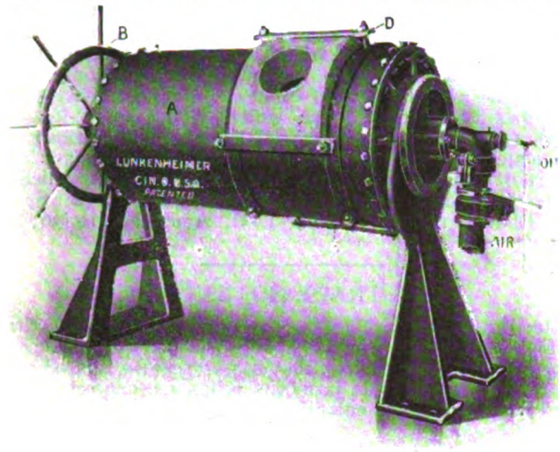
NEW METAL MELTING FURNACE.

A metal melting furnace illustrated herewith is made by the Lunkenheimer Co. of Cincinnati, O., and they claim for it patented improvements that are not found in any other make of furnace. The furnace was evolved after considerable experimenting with almost every type of furnace on the market. The following regarding it is from the manufacturers:



The furnace consists of a cylindrical sheet-steel drum *A*, having cast-iron heads. The interior of the drum is lined with fire-proof tile, and there are two openings on opposite sides of the drum. Only one of these openings is in use, the other being closed by a fire-clay filling. The object of having two openings is to increase the life of the linings of the furnace. It has been found that the furnace wears out quicker around the filling hole (which also serves as outlet for the flame) than elsewhere. This furnace possesses the advantage that when one filling hole is worn out it can be closed by a fire-clay filling and plate, the furnace reversed, and the other hole cut out and put in service. The oil burner is of a special type, designed to give the greatest amount of heat with a minimum consumption of oil. In the Lunkenheimer foundry there are ten of these furnaces in use, and six to seven heats per working day of ten hours are secured from each furnace. The weight of each heat will average about 550 lbs. and the oil consumption varies from 2 to 2½ gallons of crude oil per 100 lbs. of metal melted. The life of the linings is from 300 to 400 heats, this varying with the kind of metal melted. The whole furnace is of a heavy and substantial construction. On account of the simple form of the tile it is very easy to re-line, an objection which was found in some other types of furnaces.

With the first furnace sold to each customer within a radius of 1,000 miles of Cincinnati, the Lunkenheimer Co. will send an expert to start the furnace and take off the first heat, and instruct the furnace-room employes as to how to secure best results in handling, etc. The furnace is made in two sizes, the No. 1 size having a capacity of 550 lbs. of metal per heat, and the No. 2 size having a capacity of 1,200 lbs. of metal per heat.

By reason of the greater rapidity with which the new ships for the navy are being advanced to completion, Secretary Moody has transmitted to congress an urgent request for an appropriation of $2,000,000 for armor and armament to be made without delay. The last appropriation made for armor and armament was based on the amount expended per month last year, which was $739,706. Since July last this item has amounted to $1,109,980 per month and after Jan. 1 the manufacturers of armor have notified the department that a material increase is to be made in their output.

Attention of marine surveyors is called to the advertisement of Lloyd's Register of British and Foreign Shipping for a surveyor for the port of Halifax, Nova Scotia, on page 33 of this issue, all applications for the position to be addressed to G. Stanbury, principal surveyor for Lloyd's Register, 15 Whitehall street New York city.

Steamships, Government, Revenue and Lighthouse Vessels, Yachts and Boats of all descriptions

Supplied with

FURNISHINGS

"From Steerage to Captain's Cabin."

Covering everything that can possibly be required in

Furniture,	Galley Ranges,
Beds,	Galley Utensils,
Carpets and Rugs,	Monogram and
Upholsteries,	Crested Linens,
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Detailed work requiring special plans or sketches carried out by expert operators.

We gladly submit Estimates free of charge.

PROMPT DELIVERY OF GOODS.

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CONTRACT DEPARTMENT.

SIEGEL COOPER CO.,

6th Ave., 18th and 19th Sts.,

NEW YORK CITY.

Please mention Marine Review, when writing.

Star Metaline Bushing.

SELF-OILING.

NEW METAL

CARGO HOISTERS

Wrought Iron Hook and Strap, Galvanized Iron Shells and Sheaves. Sheaves fitted with Genuine Star Metaline Bushings with Metaline Side Bearings.

These Blocks Save the Rope and Outwear all others.

Send for 1902 Catalogue M. A. R. FREE.

Manufactured only by

BOSTON & LOCKPORT BLOCK CO.,

BOSTON, MASS. - - LOCKPORT, N. Y.

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

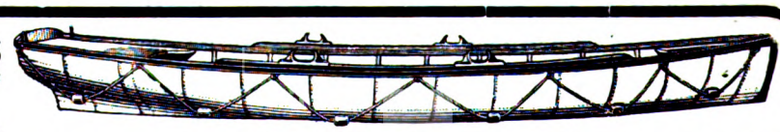
Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

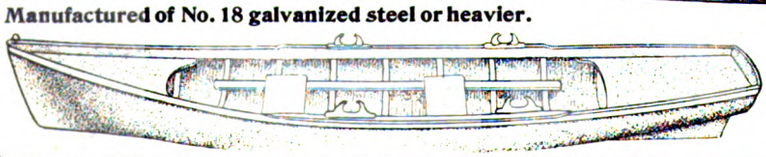
Seaboard Steel Casting Co., Chester, Pa.

Rippley's Metal Life Boats and Skiffs

Stand Government Inspection.

Manufactured of No. 18 galvanized steel or heavier.





Cuts show two of our many patterns. Prices quoted on application on almost any size metal boat or yacht hull.

Rippley Hardware Co. BOX F. **Grafton, Ill.**

Manufacturers of Metal Boats and Skiffs.

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DEATH OF REAR ADMIRAL WHITE.

Rear Admiral Edwin White, retired, dropped dead last week while walking down the main drive of the Brooklyn navy yard. He was on his way to visit the commandant, Rear Admiral Rodgers, a close personal friend. When stricken the admiral reeled, toppled over and was dead before assistance could reach him. Rear Admiral White was a native of Ohio. He entered the naval service Nov. 29, 1861, graduated in November, 1864, and became attached to the receiving ship Vermont at the New York yard Later he was ordered to the frigate Colorado, the flagship of the European station. After being promoted to the grade of lieutenant, he was ordered to the steamer Yantic as navigator. He served in that capacity in the West Indies until November, 1869. In 1871 he was executive officer of the Kansas. In 1872 the ship was detailed to receive on board at Key West a Nicaraguan surveying expedition, under Com'dr Grossman, and convey the party to Greytown. In attempting to land at that port Com'dr Grossman was drowned and Lieut.-Com'dr White took charge of the ship. He then proceeded to Aspinwall for coal, and there found the Spanish man-of-war Pizarro blockading the American steamer Virginius. He interfered, and the Virginius was allowed to sail. For this he was commended by the navy department. In 1892 he proceeded to Venezuela to protect American interests during a revolution. He then went to Colon to restore the traffic on the Isthmus, which had been interfered with. He was placed on the retired list, with the rank of rear admiral, in December, 1899.

MERRILL-STEVENS CO. REORGANIZED.

The Merrill-Stevens Engineering Co. has just completed an enlargement and change of character by the organization of the Merrill-Stevens Co. which takes its place. The old interests have organized the Merrill-Stevens Co., with an authorized capital of $500,000, taking over all the plant and business of the old company and providing for the construction of a 4,200-ton floating dock to enable Jacksonville to dock and repair the largest class of vessels that touch the port. The new dock will be a wooden dock with steel interior bulkheads and trusses, fitted with centrifugal pumping engines driven by electric motors of 150 H. P. The dock will be 280 ft. long in the body, 85 ft. wide and 12 ft. deep. The sides are 35 ft. high and the outerpiece 35 ft. long on each end, giving a length on the keel blocks of 330 ft.

In the modern industrial railway equipment where turn-tables are used for out-door work there is always a temptation to set the turn-table upon too shallow a foundation, the result being that they are thrown out of line by the influence of the frost. In the new plant of the B. F. Sturtevant Co. at Hyde Park, Mass., where special turn-tables of their own manufacture have been very successfully introduced in connection with their industrial system, each turn-table rests at the top of a brick circular well with 8-in. walls extending to a depth of 4 ft., or below the frost line. These walls are set upon hard-pan and the center filled with loose stones providing perfect drainage. The first winter's experience has shown them to be absolutely uninjured by frost.

The Admiral Aube, armored cruiser of the French navy, finished all her official trials by a run at full power of eight hours duration, made at Cherbourg on Dec. 17, and which was highly satisfactory. The indicated horse power developed was 22,155 or 1,655 above what was required of her, with a speed of 21.9 knots. The coal consumption per indicated horse power was 1.83 lbs. at the rate of 34.3 lbs. per square foot of grate area and per hour. The working of the engines and of the boilers of the Belleville type with economizers, fitted on board of this ship, was perfect.

The torpedo boat Winslow rammed the ferry boat America near the Brooklyn navy yard last week. The collision created considerable excitement among the ferry passengers, though there was no danger at any time to them. A hole several feet in length was stove in the port bow of the America by the sharp nose of the Winslow but it was above the water line. The bow of the torpedo boat was badly broken and twisted and the deck plates sprung. The Winslow had just undergone extensive repairs and had just left the navy yard.

Small Steam Barge for Sale.

I have for sale a small steam barge. Carries 250 tons. Address, Capt. F. E. Wood, Alexandria Bay, N. Y. tf

Engine Wanted.

Wanted fore-and-aft compound engine of 14 and 28 in., or a little smaller would do. Address Capt. F. Dana, Alexandria Bay, N. Y. Dec. 31

Hull Draughtsman Wanted.

Hull draughtsman experienced in battleship work wanted by the Fore River Ship & Engine Co., Quincy, Mass. Apply at once. Dec. 24

Tug for Sale.

For Sale—Tug J. W. Bennett, with or without booms Address Bayfield Towing Co., Bayfield, Wis. tf

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J STEFFENS, 57 East Twenty-second st., Chicago. tf

For Sale.

Tug Duncan City. Address, Geo. Pankrantz Lumber Co., Sturgeon Bay, Wis. tf

Engine for Sale.

For Sale.—Fore and aft compound engine, 27 and 50x40 in. Has been entirely overhauled and is as good as new High pressure cylinder can be reduced if desired Engine is now at shops of Montague Iron Works, Montague, Mich. For further particulars address the Montague Iron Works. tf

WHITE OAK
TIMBERS, PLANK
AND
DIMENSION STOCK
F. S. SHURICK,
18 Broadway, NEW YORK CITY

Fishing Tug Wanted.

Wanted—First-class steel or wooden fishing tug, about 60 ft. keel; speed about 12 miles an hour. Must be well built and not over four years old. Address I. Lincoln, Alpena, Mich. Jan. 14

Wanted.

Marine engineer to sell water tube boilers. Must be experienced in selling machinery. Address Box 54, Marine Review Pub. Co , 39-41 Wade Bldg , Cleveland, O. tf

Good Tow at a Bargain.

Ten thousand dollars will buy a lake steamer and tow barge that carry 2,200 tons of ore. Steamer has steeple compound engines and Scotch boiler. Address Box 55, Marine Review Pub Co , Wade Building, Cleveland Jan. 28

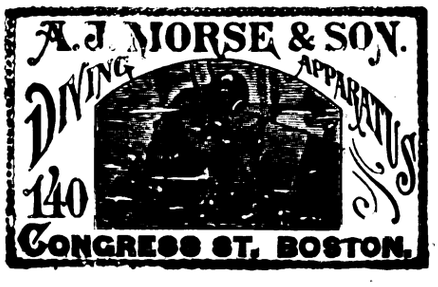
Several Tow Barges Wanted.

Wanted—To purchase several tow barges or schooners with 30 ft. beam or over Address L. E. S., Muskegon, Mich. Jan. 7

Hydraulic Steering Gear Wanted.

Wanted—New or second hand hydraulic steering gear for tug boat. Address Patrick Keohane, Fayetteville, N. Y. Dec 31

U. S. ENGINEER OFFICE, Vicksburg, Miss. Dec 22. 1903 Sealed proposals for building Locks and Dams Nos. 4 and 6. Ouachita River, Ark. and La., will be received here until 11 a m., Jan. 2 , 1904, and then publicly opened. Information furnished on application CHAS. S BROMWELL, Capt., Engrs. Jan. 14



Lloyd's Register of British and Foreign Shipping.

Surveyorship at Halifax, N. S.

NOTICE is hereby given that the appointment of surveyor to the above Society at Halifax, N. S., having become vacant, the committee have decided to appoint a surveyor to perform the combined duties of Ship and Engineer Surveyor at that port, and are prepared to receive applications from persons who may wish to become candidates for the appointment.

Candidates will be required to possess a good knowledge of the construction and repair of Iron and Steel Vessels and of the machinery of Steam Vessels.

The surveyor will not be required to be exclusively the servant of the Society, and his remuneration will depend upon the fees he may receive for surveys.

Further particulars as to remuneration and conditions of appointment, as well as forms upon which application must be made, can be obtained from Mr. Stanbury, Principal Surveyor to Lloyd's Register for the United States of America, Kemble Buildings, 15 Whitehall street, New York, by whom all applications must be received not later than 31st January, 1904.

By Order of the Committee.

(Signed), A. G, DRYHURST,
Secretary.

71 Fenchurch Street, London, E. C,
December, 1903. Jan. 7

PITTSBURGH WHITE METAL CO.
MANUFACTURERS OF THE BEST
BABBITT and ANTI-FRICTION
Metals
Known for any Purpose.
Made from the Best Materials.
Price and Quality Guaranteed and Always Consistent with the Market.
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GREAT LAKES ENGINEERING WORKS

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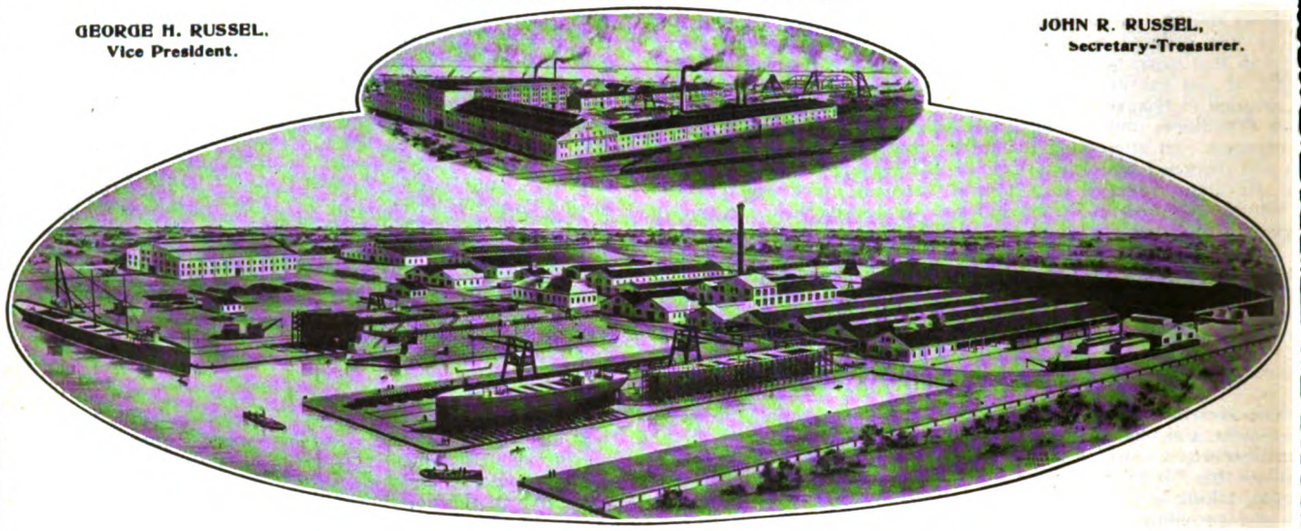
ANTONIO C. PESSANO, Pres. and Gen. Mgr.

GEORGE H. RUSSEL.
Vice President.

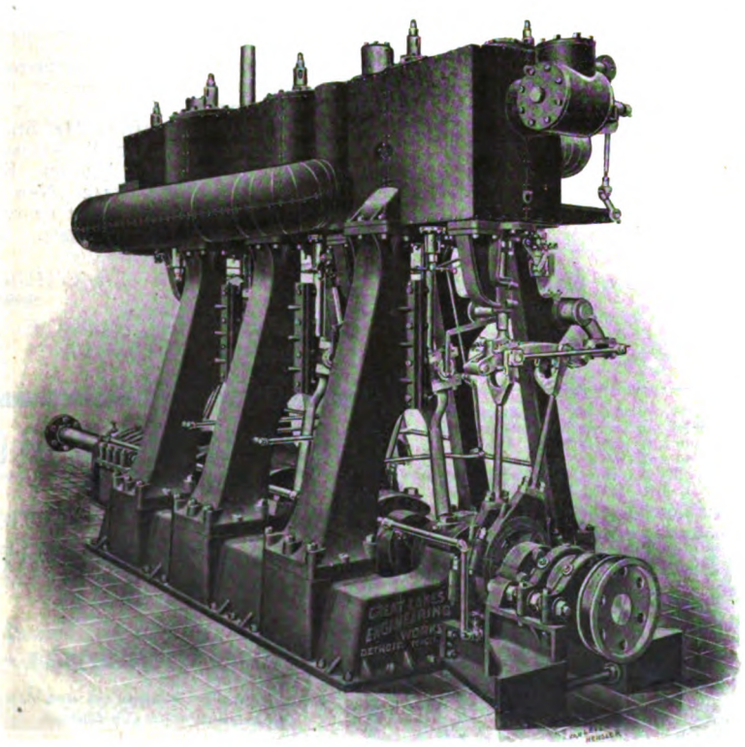
JOHN R. RUSSEL,
Secretary-Treasurer.



Steel Ship Builders

Floating Dock

Marine Engines



Marine Repairs

Hydraulic Dredges

Hydro Carbon System

Propeller Wheels

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Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. 1903 edition. $2.25.

DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8¾ in. by 5 in., cloth. $1.50.

ELECTROMAGNETIC PHENOMENA AND THE DEVIATIONS OF THE COMPASS—Com. T. A. Lyons. $6.

ELEMENTARY SEAMANSHIP—by Barker. New and enlarged edition. $2.50.

ELEMENTS OF NAVIGATION—Henderson. $1.

HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes. $3.75.

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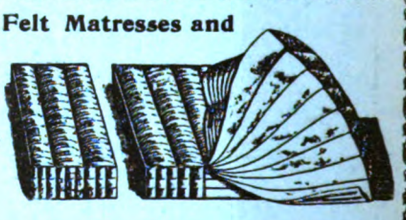

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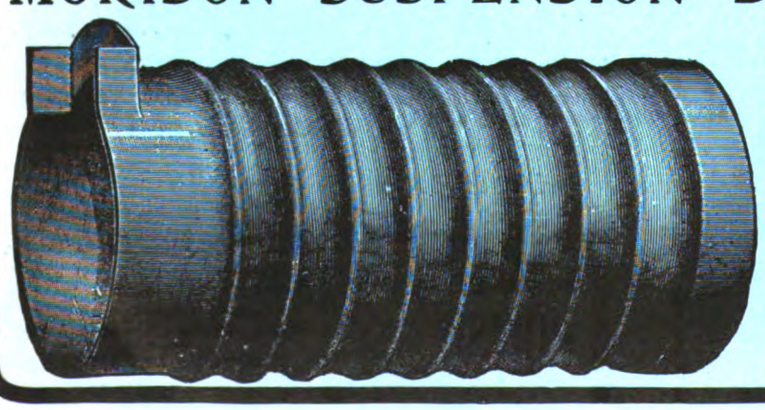

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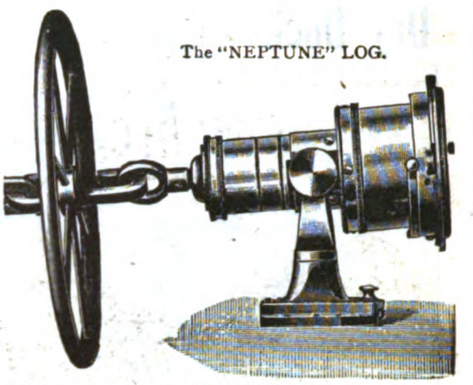
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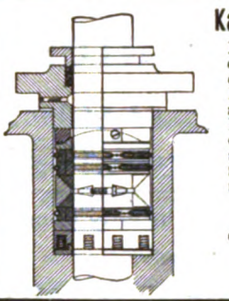

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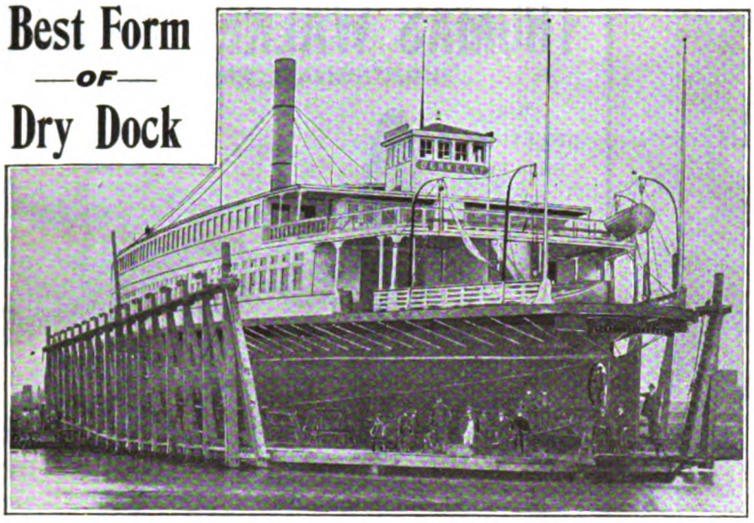

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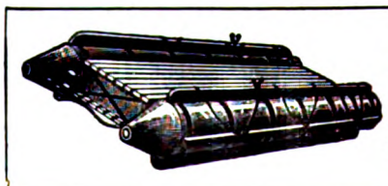

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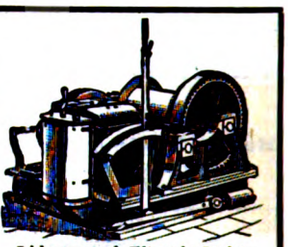

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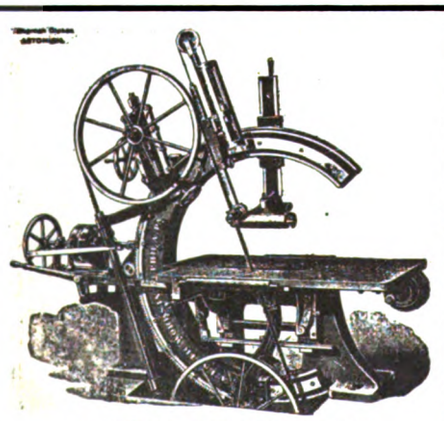

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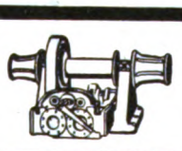

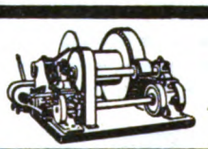

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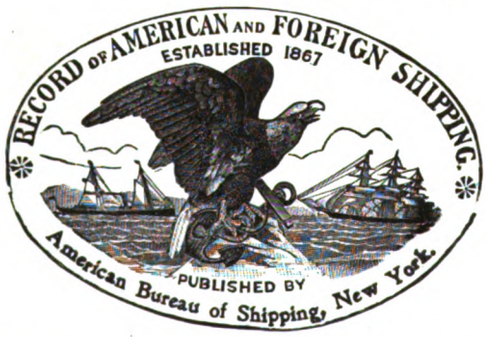

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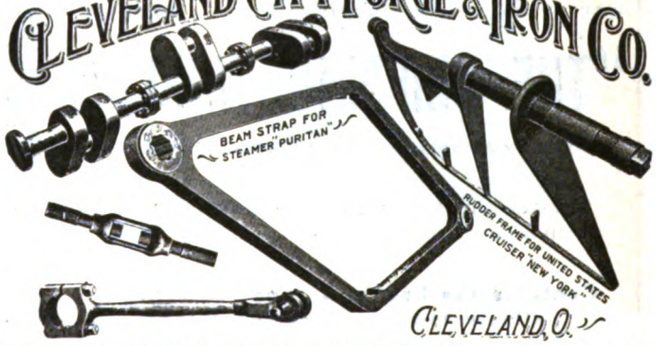

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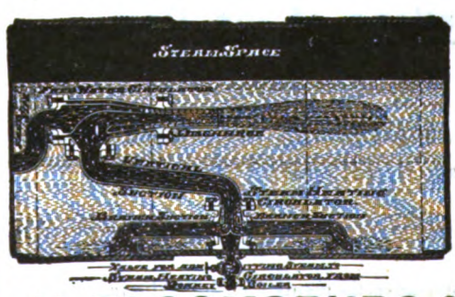

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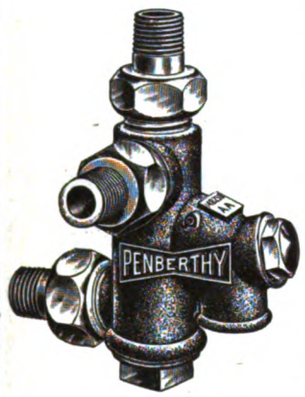

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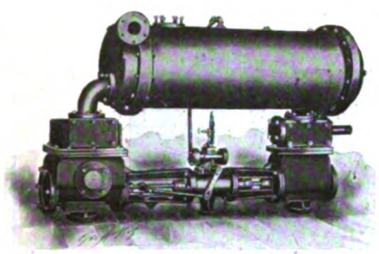

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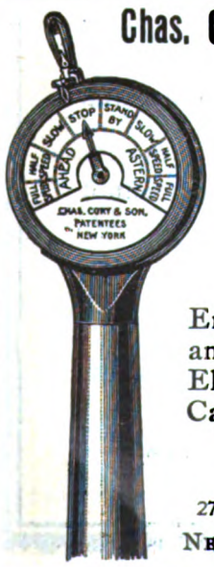

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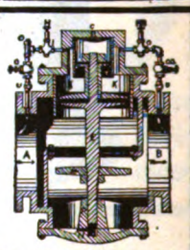

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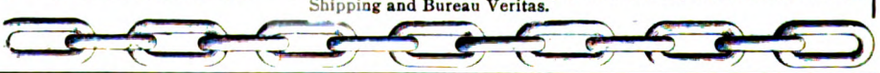

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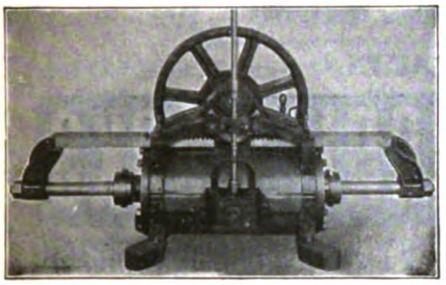

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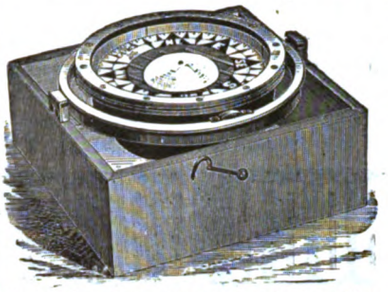

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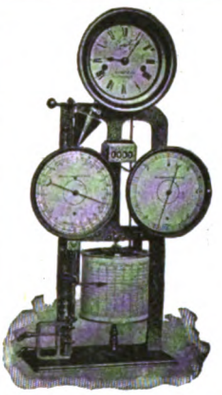

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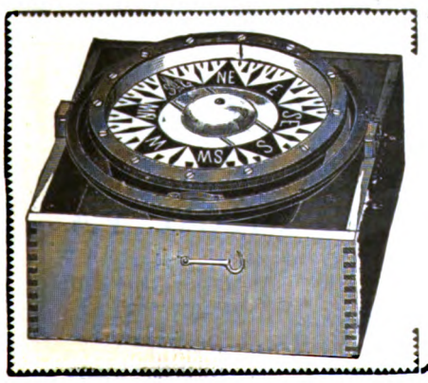

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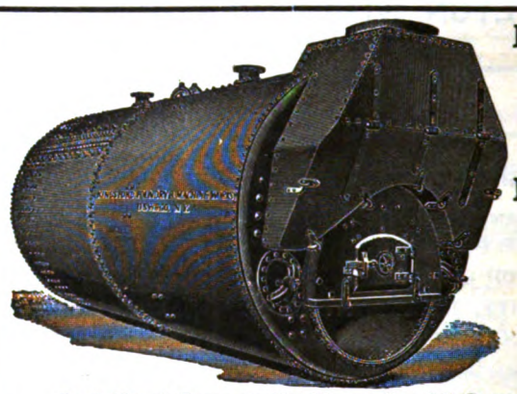

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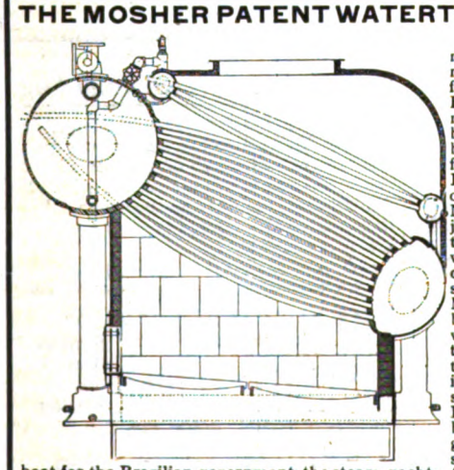

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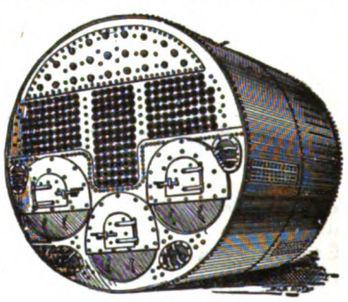

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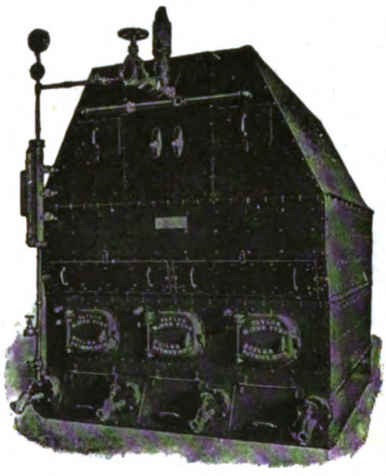

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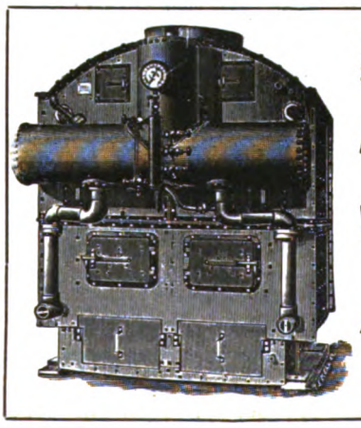

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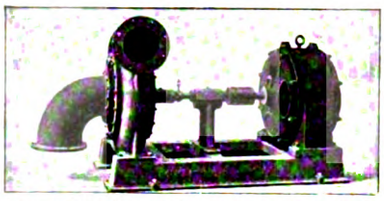

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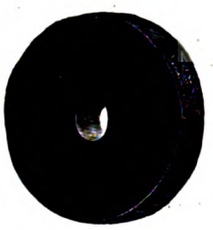

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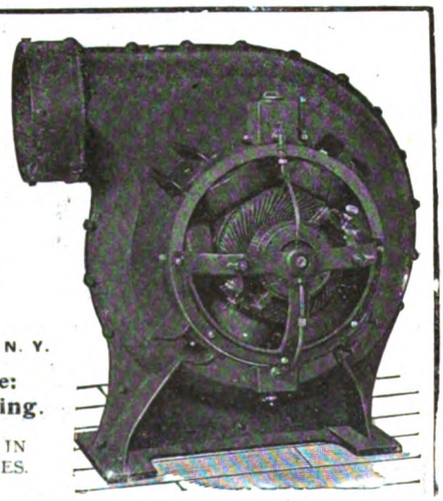

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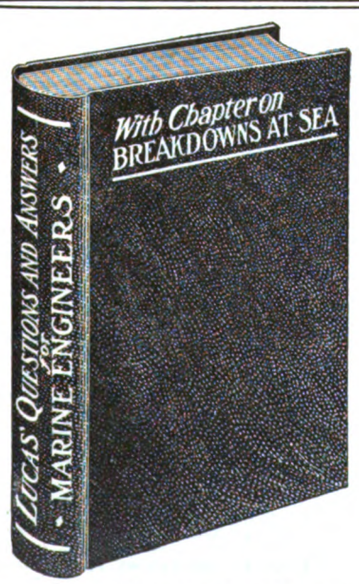

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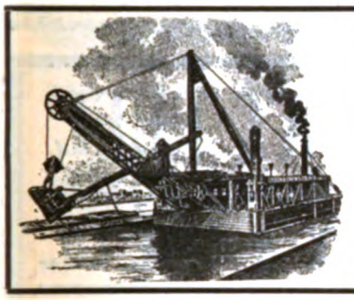

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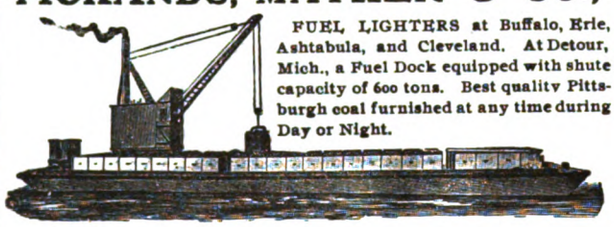

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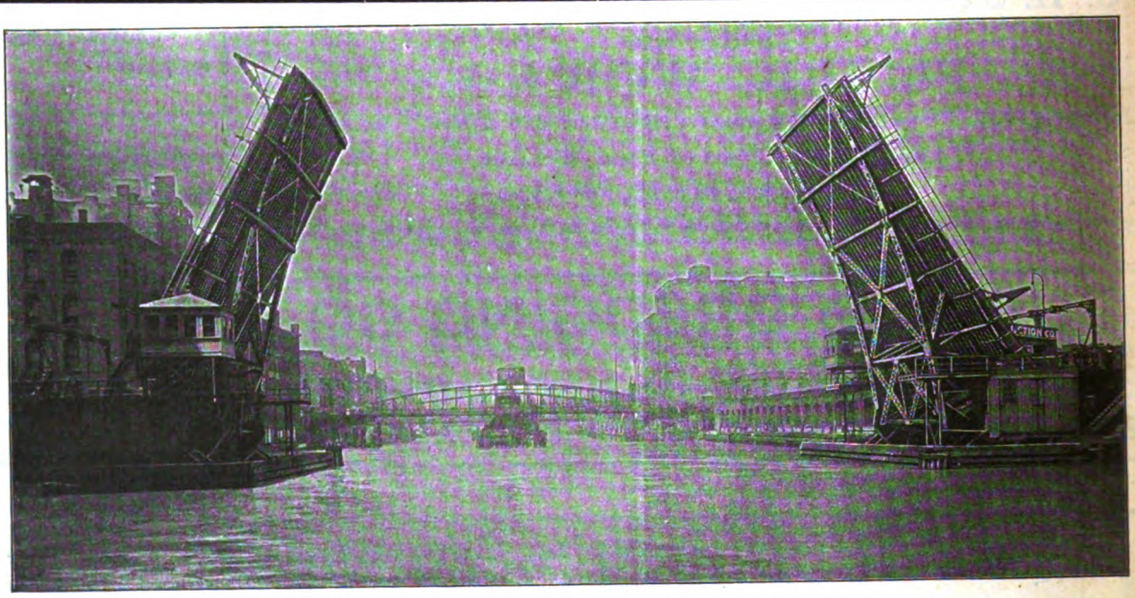

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Philadelphia & Reading Coal Docks.
The Harbor.
The Bluffs.
"Last Trip From Duluth."

ERIE, PA.
Anchor Line Docks and Pennsylvania R. R. Co.'s Ore and Coal Docks.
Pennsylvania R. R. Coal Trestle.
Pennsylvania R. R. Co.'s Docks. Unloading Ore
Hanna's Ore Plant.
Coal Trestle and Car Dumping Plant.

OSWEGO, N. Y.
Coal and Ore Docks.

ST. CLAIR FLATS.
Str. Tashmoo Entering Ship Canal.
A Freighter Leaving Ship Canal.
Lake Vessels Old and New.
Nightfall on the River.
A Lumber Tow.

SAULT STE. MARIE, MICH.
General View of Locks from Offices.
Poe Lock, from below, closed.
Poe Lock, from below, open.
Poe Lock, from above.
Poe Lock, with Whaleback.
Weitzel Lock, from above.
Weitzel Lock, from below.
Str. North-Land Passing Locks, two views.
Upper Entrance to Lock Canal.
Gate Mechanism.
Interior of Power House.
Canadian Lock from Upper End.
Canadian Lock from Lower End.
The Rapids, looking up.
The Rapids, looking across.
Indians fishing in the rapids.

PANORAMIC VIEWS.—7x17 inches at $1.75 each.
Lackawanna Ore Docks—Unloading ore.
American Steel & Wire Co.'s Plant, Cleveland.
Ore Docks and Harbor, Cleveland.
Ore Docks, Cleveland.
Water Front, Detroit, from Windsor.
Coal and Ore Docks at Oswego.

Address: MARINE REVIEW PUB. CO.,
39-41 Wade Bldg., Cleveland, Ohio.

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BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying Index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Dake Engine Co.....Grand Haven, Mich.

AIR PUMPS AND APPLIANCES

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co.....Binghamton, N. Y.
DeGrauw, Aymar & Co.....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd....Philadelphia.
Pittsburg White Metal Co.....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILEDS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Detroit Shipbuilding Co.....Detroit.
Great Lakes Engineering Works..... Detroit.
Sturtevant, B. F. Co.....Boston.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Brown, Harvey L.....Buffalo.
Faust, Lieut., Wm. H. ..... Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E.....Chicago.
MacDonald, Ray G.....Chicago.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co.....Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co., ...Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co..... ....Grafton, Ill.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Boyer's Sons, L. .....New York.
Chicago Ship Building Co.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Delauney Belleville & Co.....St. Denis, France.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Forest City Boiler Co.....Cleveland.
Great Lakes Engineering Works ..... Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works Oswego, N. Y.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher Water-Tube Boiler Co .....New York.
Newport News Ship Building Co Newport News, Va.
Northwestern Steam Boiler & Mfg. Co., Duluth, Minn
Risdon Iron Works.....San Francisco.
Roberts Safety Water Tube Boiler Co..New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Union Machine & Boiler Co.....Cleveland.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER RIVETS.

Bourne-Fuller Co. .....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

BOOKS, NAUTICAL AND ENGINEERING.

Audel & Co., Theo.....New York.
Marine Review Pub. Co.....Cleveland.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works..... Detroit.
Lunkenheimer Co.....Cincinnati.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co.....Philadelphia.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co.....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Wellman-Seaver-Morgan Co. .....Cleveland.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CARPETS, FURNITURE, BEDS, ETC.

Siegel Cooper Co .....New York.

CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co. .....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co. .....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM.

With Steam Heating Attachment.
Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.
Bliss, John & Co.....New York.
Chelsea Clock Co.....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Lidgerwood Mfg. Co.....New York.
Wellman-Seaver-Morgan Co.....Cleveland.

COMPASSES.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

COMPASS ADJUSTER.

Smith, Capt. W. J. ....Seattle, Wash.
McNevin, Alfred D'A. .....Detroit.

CONDENSERS.

Thropp & Sons Co., John E. ....Trenton, N. J.

CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co ..... Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee

COPPER, TIN AND SHEET IRON WORK.

McCutcheon, C. H.....Buffalo.
Rippley Hardware Co .....Grafton, Ill.

CORDAGE

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg Pa.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot .....Long Island City, N. Y.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

DISTANCE FINDER.

Nicholson Ship Log Co.....Cleveland, O.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A.....New York.

DREDGING CONTRACTORS.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co...Chicago.
Dunbar & Sullivan Dredging Co .... Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A. .....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

DRYING APPARATUS.

Sturtevant, B. F. Co.....Boston.

DRY DOCKS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Chicago Ship Building Co.....Chicago.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Great Lakes Engineering Works ..... Detroit.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....New York.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co Newport News, Va.
Shipowners Dry Dock Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
United States Ship Building Co.....New York.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Chicago Ship Building Co.....Chicago.
Chase Machine Co.....Cleveland.
Craig Ship Building Co.....Toledo, O.
Cramp, Wm. & Sons.....Philadelphia.
Dake Engine Co. .....Grand Haven, Mich.
Detroit Ship Building Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Mosher, Chas. D.....New York.
Moulton Steering Engine Co.....New York.
Newport News Ship Building Co Newport News, Va

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Northwestern Steam Boiler & Mfg Co., Duluth, Minn.
Riedon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.....Buffalo.
United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.
MacLean Hydraulic Signal Co.....Chicago.

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.....Chicago.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
McCutcheon, C. H.....Buffalo.
Moogers & Co., H.....Milwaukee
New York Belting & Packing Co.....New York.
Northwestern Steam Boiler & Mfg. Co., Duluth, Minn.
Reilly Repair & Supply Co., James....New York.
Rippley Hardware Co.....Grafton, Ill.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland.
Hunt, Robt. W. & Co.....Chicago.
Kidd, Joseph.....Duluth, Minn.
Loveioy, H. O.....Buffalo
Matteson & Drake.....Philadelphia.
Moffat & Son.....San Francisco
Mosher, Chas. D.....New York.
Nacey, James.....Cleveland
Newman, R. L.....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V.....Chicago.
Rice, Henry.....Buffalo.
Roelker, H. B.....New York.
Sadler, Perkins & Field.....New York.
Steel, Adam.....Cleveland
Wood, W. J.....Chicago.

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston.

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo.
Reilly Repair & Supply Co., James....New York.
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.
Fore River Ship & Engine Co.....Quincy, Mass
Macbeth Iron Co.....Cleveland

FLUE WELDING.

Fix's, S. Sons.....Cleveland.

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland.
Pittsburg Coal Co.....Cleveland.
Rochester & Pittsburg Coal & Iron Co.....Buffalo.
Smith, Stanley B. & Co.....Detroit
Smith Coal & Dock Co., Stanley B.....Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago.

GALLEY UTENSILS.

Siegel Cooper Co.....New York.

GASKETS, RUBBER.

New York Belting & Packing Co.....New York.

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston
Lunkenheimer Co.....Cincinnati.

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GROCERIES AND SUPPLIES.

Siegel Cooper Co.....New York.

HATCH FASTENERS.

Mulholland, Capt. M.....Cleveland.

HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., (Inc.)....Cleveland.
Chase Machine Co.....Cleveland.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....New York.
Hyde Windlass Co.....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co.....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York.

HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

ICE MACHINERY.

Roelker, H. B.....New York.

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.

INJECTORS.

American Injector Co.....Detroit.
Crane Co.....Chicago.
Jenkins Bros.....New York.
Lunkenheimer Co.....Cincinnati.
Penberthy Injector Co.....Detroit, Mich.

INSURANCE, MARINE.

Brown & Co.....Buffalo.
Elphicke, C. W. & Co.....Chicago.
Fleming & Co., P. H.....Chicago.
Hawgood & Co., W. A.....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co.....Cleveland.
McCarthy, T. R.....Montreal.
McCurdy, Geo. L.....Chicago.
Mitchell & Co.....Cleveland.
Moffat & Son.....San Francisco.
Peck, Chas. E. & W. F. ..New York and Chicago.
Prindiville & Co.....Chicago.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H.....New York.

IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland.
Hanna, M. A. & Co.....Cleveland.
Pickands, Mather & Co.....Cleveland.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.....Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P.....Chicago.

LIFE FLOATS.

Carley Life Float Co.....New York.

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co.....Pittsburg.
Carley Life Float Co.....New York
Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, D.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....Mariner's Harbor, S. I., N. Y.
Rippley Hardware Co.....Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helvig, H. A. J.....New York.
Russell & Watson.....Buffalo.

LOGS.

Bliss, John & Co.....New York.
Nicholson Ship Log Co.....Cleveland.
Walker & Sons, Thomas.....Birmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.....Chicago.
Lunkenheimer Co.....Cincinnati.

LUMBER.

Martin-Barriss Co.....Cleveland.
Moran Bros. Co.....Seattle, Wash
Shurick, F. S.....New York.

MACHINISTS.

Chase Machine Co.....Cleveland.
Lockwood Mfg Co.....East Boston, Mass
Macbeth Iron Co.....Cleveland.
Moogers & Co., H.....Milwaukee
Union Machine & Boiler Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia

MARINE RAILWAYS, BUILDERS OF

Crandall & Son, H. I.....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.
Siegel Cooper Co.....New York.

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Baltimore, Md.
Detroit Ship Building Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

METALLIC PACKING.

Hayden Mfg. Co., N. L.....Columbus, O.
Katzenstein, L. & Co.....New York.
U. S. Metallic Packing Co.....Philadelphia.

METAL POLISH.

Bertram's Oil Polish Co.....Boston.

MOTORS, GENERATORS—ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Sturtevant, B. F. Co.....Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co.....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School.....Chicago.
Gould's Navigation School.....Cleveland.
McNevin's Navigation School.....Detroit
McNevin's Navigation School.....San Francisco.
Seattle Nautical School.....Seattle, Wash.

NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.
Kidd, Joseph.....Duluth, Minn.
Loveioy, H. O.....Buffalo.
Matteson & Drake.....Philadelphia.
Mosher, Chas. D.....New York.
Nacey, James.....Cleveland.
Newman, R. L.....New York.
Rice, Henry.....Buffalo.
Sadler, Perkins & Field.....New York.
Steel, Adam.....Cleveland.
Wood, W. J.....Chicago.

OAKUM.

DeGrauw, Aymar & Co.....New York.
Stratford Oakum Co.....Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B.....Allegheny, Pa.

OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.
Standard Oil Co.....Cleveland.
United States Graphite Co.....Saginaw, Mich.

PACKING.

Crane Co.....Chicago.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros.....New York.
Katzenstein, L. & Co.....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co...Philadelphia.

PAINTS.

Baker, Howard H. & Co.....Buffalo.
Detroit Varnish Co.....Detroit
Detroit White Lead Works.....Detroit.
New Jersey Zinc Co.....New York.
Sipe & Co., James B.....Allegheny, Pa.
United States Graphite Co.....Saginaw, Mich.
Upson-Walton Co.....Cleveland.

PATENT ATTORNEYS.

Thurston & Bates.....Cleveland.

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.....Buffalo.
Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.
Dunbar & Sullivan Dredging Co.....Buffalo.
Fitz-Simons & Connell Co.....Chicago.
Lake Erie Dredging Co.....Buffalo.
Smith Co., L. P. & J. A.....Cleveland.
Starke Dredge & Dock Co., C. H.....Milwaukee.

PIPE-JOINT COMPOUND.

United States Graphite Co.....Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland.
Crane Co.....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.....Cleveland.

PLUMBING, MARINE.

Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son.....New York.

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BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PNEUMATIC TOOLS.

Allen, John F. .....New York.

POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston

PRESSURE REGULATORS.

Kieley & Mueller .....New York.
Ross Valve Co. .....Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co.....Detroit.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co Newport News, Va.
Phosphor Bronze Smelting Co., Ltd. ..Philadelphia.
Risdon Iron Works.....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Shipbuilding Co ..... Superior, Wis
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trout, H. G. .....Buffalo.
United States Ship Building Co.....New York.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co.....New York.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co.....Cleveland.

PUNCHES, RIVETERS, SHEARS.

Allen, John F.....New York

RANGES.

Russell & Watson .....Buffalo.
Siegel Cooper Co.. ..... New York

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland
Record of American & Foreign Shipping.New York.

RIVETING MACHINES.

Allen, John F .. ..New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co ..... Chicago
Hayden Mfg. Co., N. L. .....Columbus, O.
Lunkenheimer Co.....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS, NAUTICAL.

Chicago Nautical School..... .....Chicago.
Gould's Navigation School ....C'eveland.
McNevin's Navigation School .... Detroit
McNevin's Navigation School..... ....San Francisco.
Seattle Nautical School..... .. Seattle, Wash.

SEARCH LIGHTS.

Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia
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Detroit Ship Building Co. .....Detroit.
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Great Lakes Engineering Works.....Detroit.
Jenks Ship Building Co.....Port Huron, Mich.
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Manitowoc Dry Dock Co. .....Manitowoc, Wis.
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Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Newport News Ship Building Co Newport News, Va.
Risdon Iron Works.....San Francisco.
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Shipowners Dry Dock Co. .....Chicago.
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United States Ship Building Co.....New York.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

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Moran Bros. Co.....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

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Russell & Watson .....Buffalo.

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Shurick, F. S. ..... New York.

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Holmes, Samuel .....New York.
McCarthy, T. R. .....Montreal, Can.
Moffat & Son ..... San Francisco
Newman, R. L. .....New York.
Weeks, F. H. .....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line .....New York.
International Mercantile Marine Co Philadelphia.
Pere Marquette R. R. & S. S. Line.....Milwaukee.
Red Star Line .....New York.

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Seaboard Steel Casting Co. .....Chester, Pa.
Macbeth Iron Co.....Cleveland.

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Chase Machine Co.....Cleveland.
Dake Engine Co. .....Grand Haven, Mich.
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Hyde Windlass Co. .....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Moulton Steering Engine Co..... ... New York.
Sheriffs Mfg. Co. .....Milwaukee.

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Schrader's Son, A. .....New York.

SURVEYORS, MARINE.

Gaskin, Edward .....Buffalo.
Hynd, Alexander ..... Cleveland.
Lovejoy, H O ..... Buffalo.
Matteson & Drake ..... Philadelphia.
Nacey, James ..... Cleveland.
Newman, R. L. .....New York.
Rice, Henry ..... Buffalo.
Steel, Adam ..... Cleveland.
Wood, W. J. .....Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. .....Chicago.
Pittsburg Testing Laboratory Ltd. .....Pittsburg.

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New York Belting & Packing Co. .....New York

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Watson-Stillman Co. .....New York.

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Chase Machine Co. .....Cleveland.

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Midland Towing & Wrecking Co., Ltd.Midland, Ont.

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Lunkenheimer Co. .....Cincinnati.
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Ashton Valve Co. .....Boston.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L. .....Columbus, O.
Jenkins Bros. .....New York.
Kieley & Mueller .....New York.
Lunkenheimer Co. .....Cincinnati.
Mooers & Co, H..... ..... Milwaukee.
Ross Valve Co. .....Troy, N. Y.

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Ross Valve Co. .....Troy, N. Y.

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Detroit White Lead Works..... ..... Detroit.
New Jersey Zinc Co.....New York.
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Elphicke, C. W. & Co. .....Chicago.
Fleming & Co., P. H. .....Chicago.
Hall & Root .....Buffalo.
Helm & Co., D. T. .....Duluth.
Hawgood & Co., W. A. .....Cleveland.
Holmes, Samuel .....New York.
Hutchinson & Co. .....Cleveland.
McCarthy, T. R. .....Montreal.
Moffat & Son..... San Francisco.
Newman, R. L. .....New York.
Mitchell & Co. ..... Cleveland
Prindiville & Co ..... Chicago.
Richardson, W. C. .....Cleveland.
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No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 48, Ac via Sandusky..	†1:40pm	.....
No. 44, Cleve. & N. Y Sp.	.....	*3:00pm
No. 46, Southwestern Ex.	....	*3:10pm
No. 116, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent Lim....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.....	†9:10pm	†9.25pm
No. 126, Norwalk Accom.	†8:10am	.....

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No. 11, Southwestern Lim	*3:20am	.....
No. 7, Day Express.....	.....	†6:00am
No. 15, Bost & Chi Sp....	*3:05am	*3:15am
No. 19, Lake Shore Lim..	*7:05am	*7:15am
No. 23, Western Express.	*10:30am	*10:35am
No. 29, Southwestern Sp.	‡11:10am	.....
No. 31, U S Express.....	‡11:55am	‡12:05am
No. 33, Southwestern Ex	*12:25pm	.....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47 Accomodation.....	†11.00am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37, Pacific Express...	*6:50pm	*7:20pm
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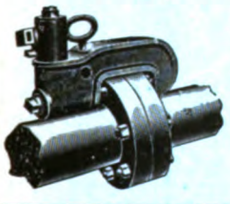

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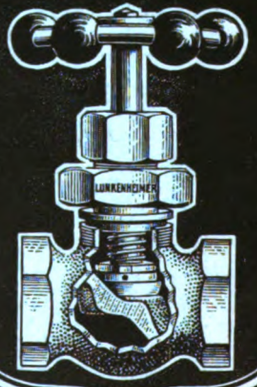

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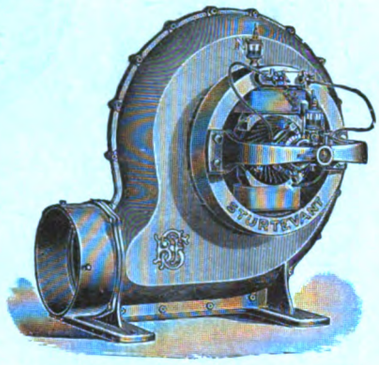

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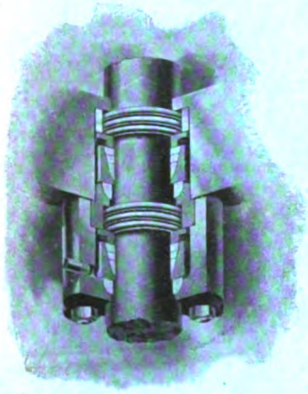

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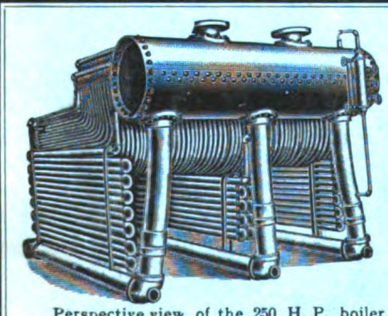

Perspective view of the 250 H. P. boiler built for the steam freighter "Clara," having 6 ft. space and 8 ft. length; 34.4 sq. ft. of grate area and 1,900 sq. ft. heating surface; weight of boiler and water, 14,000 lbs. Replaced a return tubular boiler, thereby saving in dead-weight of boiler and water, 16½ tons. The Clara now has 14 in. less draft and an increased earning capacity of $10 per day.

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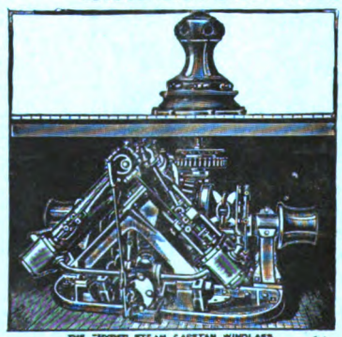

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